**Produce fewer** 

doctors BMA

Prompted by fears that Britain will som be pruducing ton many the fors, the British Medical Association is to ask the Reyel Commission on the Builth Service for an interior

report on the need to slaw this pro

cerion).
Ono medical achool deem sai

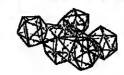
the real motive for the junior decrers demond was solfish: they had recently become nworo of their

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hy Clive Cookson

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premises and offers all includes for mnovelvates, their fluorism frequent premises and offers all includes for mnovelvates, each allow programmes. Surfacts are proposed to The pulyredimica agrae with the teaching of children agad 28 years in addition, som EA's a lins, according to Mr for Child Development Assistants is to be offered with an Pereira Mendoza, Director Applications are revited for appointment to the post. South Back and challenged of the

Principal Lecturer is, but they disagree with its lethods.

Early Childhood Studies "The ILEA is conscious of its service and extensive teaching agade to have further information periode in the area of larly Childhood Studies for distributed. But we don't consider possibility for prognations in treatment characterists and admonstrates are authority's proposal the best possibility for prognations in treatment characterists for contest in a recent private maeting with allocation appropriates, to obtay allocation, and pussibly feels in an authority in tentary meanances in treatment characterists for contest in a recent private maeting with allocation appropriates, to obtay allocation distributed. But we don't consider the contest in a recent private maeting with allocation appropriates, to obtay allocation distributed for the programment is iteration, as class the committee, the directors probable (Shlay: \$A22,55t to \$A23,492 per sommo maga propriates should common date for the plantage with the private masses in the programment of the programme

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Applications should raching and present position these oxternal accounts are pussed and my other national and adjourned to be seen and adjourned the seen of the ILEA and however, decided and my other information considered televant. Applications of the seen o

"REVIEW OF NEW

a Education Authority.
The LLEA will shortly ask its

and any other information considered relevant Affinat using different private firms of itons close on 11th February, 1977

iconstants in this way would mean inquiries to its firm a private firms of iconstants in this way would mean addressed to the Association of Commonwealth Univertities for about £25,000 to £30,000.

A cappol this application should be sent to the Principal work of about £25,000 to £30,000.

Touchers' College, 146 Gurran Shoul, Hawlown, N.S.W., Associated by amplification in the words of a leading it in the words

Thoy say it will be a means of eliminating waste and the fLEA officials point out the authority is under some pressure from the allstrict auditor—an official independent of particular local authorities—to show have the maney in being spent within the polytechnics. Staff cut threat on overseas issue

THE TIMES

SUPPLEMENT

MA STEID

# In outcoments were not made. To onable the reduction to be made the polytechnic would be esked to consult this entirely before filling only teaching steaf vacancy which arms after March, 1977." The latter outlines to each af the four the reduction in overseas numbers necessacy to meet its cutback.

Four polytechnics funded by the fairer London Education Authority have been instructed to reduce COURSES" feature hunders or face a cutback in teach ing staff.

minimary of face a cutback in teaching and the properties of North London.

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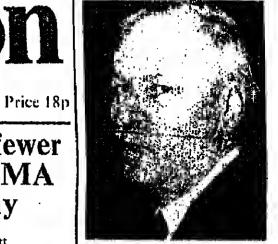
County Hall politicions and poly-

audit scheme is not a means of forcing stricter political control

technic directors emphosize

#### Contents

**British Council** 



The Swann report has recommended that the British Council should be made responsible for university work overseas David Walker reports, 6

Sue Reid describes the work of the council in Spain in the first of a twopart special report, 8

#### Vorticism

This remacal, contained in the BMA's draft evidence to the cammission, is principally the result of pressure from junior hospitel doctors werried by the pruspect of serious unempleyment in the 1980s. In oil internal report the BMA flospited Junior Staff Committee bes demanded on immediate cut in medical school intake from 3,600 to 2,600 e yan;

The committee chairmen, Mr David Wardle, explained three main reasons for this dramatic proposal:

The big expansion programme of the 1960s and early 1970s depended on farecasts of a substantial population increase during the rest of the century. But the birth rate is now failing. Brian Petrie discusses a major study of this early • The programme's success relied no the erroneous assumption the growing unifound wealth would allow twentieth century movement in modern art, 15

Barry Commoner

graving unitous wealth would allow governments to pour more resources into the health service.

• Nearly avery Europeen country is ar anon will be producing too many doctors. There is alroady medical unemployment in Scaudinavia and it is soon likely to spread through the EEC, where there is now free movement of doctors.

The junior doctors believe the f,000 a year drop in medical school intake could be achieved by reducing the number of students in aech school. None would necessarily heve to close oud the ent-back could have boneficial results in schools whose facilities ore over steetcheil. David Dickson talks to the American biologist who has become an ecology prophet, 7

schools whose facilities ore ovar stretcheil.

The report slso colls for the establishment of an independent review body to keep watch on the output of doctors from year to year.

Dr Wordlo said that daspite the unraliability of the relevant statistics and forocasting methods euough was known to justify immediats drastic acoon because of the great time lag botween entry and qualification as specialists. Scottish students

Stanley Johnson examines the implications of the falling birth-rate on demand for higher education in Scotland, 11

History books

as specialists.

The medical schools are certain to resist a large enforced cut in intake, though it is now generally eccepted that there should be no rise beyond about 4,000 a yesr (compared to the target of 5,000 students a year by 1990, set by the 1968 Rayal Commission on Medical Education The Anglo-Irish, German feminists, and slavery are among the subjects covered in five special pages of reviews of new history books, 17-21

A new Carnegie Council survey shows more conservative opinions gaining ground in American universities and colleges, 12

Don's diary Noticoboard North American nows Oversees news Letters Clessified indox

Twenty local authorities have fuiled to implement the new conditions of service for further education staff ogreed nationally neorly two years ogo and due to be introduced this month, Mr Stan Broadbridge, general secretary designote of the Netional Association of Teechera in Further and Higher Education, has revealed.

revealed.

Giving hie first prese conference since his appointment lust November Mr Broadbridge said the majority of the local authorities involved were "holding out" ou teclinical grounds and the number who were being purely recalcitrant might be only one or two.

But Mr Tom Driver, NATFHE's present generol secretary, warned that the association would be prepared to take action against them. Those which may prove difficult may be ill down to about three. If they do not come into line we will take oction. We will use the strength of NATFHE to get ngreement."

It was Initially agreed by the Council of Local Education Authorities and the leading further education teachers' associations that local authorities should introduce the new conditions, which include a 30-hnur weck for lecturers and 14 weeks' holiday a year, by January 1.

But the introduction of the incomee policy has led to difficulties regarding implementation in some oress and the associations' local liaison committees have agreed that

liaison committees have agreed that in these areas some of the condi-tions of service provisions coo be

The orticle is scentical about a stotement issued in a Department of Education and Science Greeder last year which claimed that the Government did not consider that reductions of the order of 20,000 to 30,000 public sector employees needed to entail uny general recourse to redundancies.

"Normal wasters and source of the order of 20,000 in the order of 20,000 in 30,000 public sector employees needed to entail uny general recourse to redundancies.

in these areas some of the conditions of service provisions coo be deloyed.

Commenting on his priorities for the future Mr Broadbridge said he hoped to strengthen links between NATFHE end other teaching sasociatione and work towords professional unity.

Ha was also concerned obout the reletionship between the Department of Education ends Science and tho Training Services Agoncy. "I would like to see considerably more coordination than of present between these two bodies and more emphasis on the amoney being evailable on the education side."

Mr Driver said tho possibility of

these two bodies and more emphasis on the money being evailable on the coucation side."

Mr Driver said the possibility of coordination between the DES and the TSA was a question that the deportment itself was beginning to consider seriously for the first time, real difficulties in Individuol authorities. Whetever sections have been made in the overell figures they will oot necessarily be reflected in the decision of any individual entirely. That is why campaigning against the cuts will have to be devel."

## Tory students visit USSR

Three members of the Federotion of Conservative Students are in Russis on a study tour os gueets of the Soviet government. My Michael Forsyth, the federation's chairman, My Peter Booth and My David Wilks left on Januery 15 and will return on Tuesday, having visited a veriety of institutes in government and in industry.

Last year the federation was criticized by its opponents in the Netional Union of Students after secrot plans for o visit to South Africa at the expense of the Government there were revealed.

The three students pold their own travel expensee but were being paid for in Russia by the student council of the Soviet Unioo.

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Experts fear

weak link in

campus safety

Fears are growing among experis, especially in trodes unions, that the departmental sufety officer may be a weak link in universities' sufety

At e recent symposium of the

Universities. Safety Association at the University of Manchester Institute of Science and Technology, platform speakers and the full-time university safety officers in the emilience expressed concern that the deportmental officer, always an academic with o full load of teeching and rescorch commitments.

orrangementa.

The AUT is concerned then view of the wife of the composition of the systematic principal to the continuity appointed in continuity and the systematic principal to the sy

REMEMBER THE GOOD OLD

TO KNOW REMAISSANCE

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A CHAT IN THE DOLE RUCK?

will keep students out'

More underty culcular and proposed to the process of the

#### EMPLOYMOINdustry-type office unding coreseen

Iniversity financing is moving to-rards the industrial pottern, Mr. L. W. Holder, the treasurer, has old the Court of Both University in rards the investigation of the treasure.

W. Holder, the treasure.

I. W. Holder, the treasure.

Is annual report. Industrial Income as not predictable over o quintendum end it was only possible of survive through a cominual prosess of adepting expenditure and ovestment to income.

If the economic crisis continued in the economic council awards os centry qualifications to degree courses.

This atrong recommendation has come in a document distributed to come i

here would be great scope for in-entiveness and chonges which alght not all be daininging to the

acallenite with of all load of teaching and rescorch commitments, was liable to law neither the time nor, in some cases, the inclination, to do his dutter property, of the Association of Selevines of the Association of Sel

#### TEC awards bring challenge to entry tutors

University admissions tutors have University admissions tutors have been told to atrangthon their contacts with further education colleges in praparation for their role in evoluting the new Technician Education Council awards os entry qualifications to degree courses.

ences between the new TEC qualifi-cations and the Ordinary and Higher Notional Diplomo and Certi-fleate awards and City and Guilds certificates they will eventually

Drink 'replaces drugs as main problem

1977/78, Professor L. C. Gower, the vice-chancellor, said last week. Introducing his annual report for 1975/76 to the university court, he sold his prediction was based on the need for the university to continue expanding its oredical school and to increase its student numbers. But it would nevertheless suffer a substitute which needless suffer a

reduction which would not be restured for some years. He warned that it could not make many more economies without either lowering its standards or enlarcing reduit-

its standards or enlarcing redundancies.

What were most likely to suffer were the cultural facilities the university provided to the local community which this university was nt present subsidizing by over £40,000 as year.

Southampton's income for rescarch, however, increased lost year in real terms by over 25 nor cent, nupplied research, Professor Gower warms on standards the density of the university was not research income from outside sources than frum the University Grams Committee. The engineering and applied sciences faculty received more research income from outside sources than frum the University Grams Committee. The engineering and applied sciences faculty received more research income from outside sources than frum the University Grams Committee. The engineering and applied sciences faculty received more research income from outside sources than frum the University Grams Committee. The engineering and applied sciences faculty received more research income from outside sources than frum the University of Grams Committee. The engineering and applied sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British and sciences faculty received more research income from outside sources than frum the University of British

sign of the university's interest in applied research. Professor Gowersays.

It received more from rescorch couocils and Government departments than ony other provincial university except Bruningham, and on a per capital basic more than ony other British university including the cambridge, Oxford end London.

Tresearch and dovelopment on imlustriol production.

Professor Gower warned that post-goodete work was likely to be seriously affected by the increase in thin one of the control of the contr

Two new professors have been oppointed of Manchester University
Medical School—Dr John Daly la
Chemical pathology and Dr John
Gosling in Anatomy, Dr Doly, aged
45, will be the first man to neeupy
the new chair of chemical pathology.
He comes from Charling Cross linsplint Medical School in London to
toin o team of young professors
with their clinical base at Hopo
Hospianl, Sufford.
Dr John Gosling, 37, graduated

Dr John Gosling, 37, graduated from Mauchester in 1963 and has spent his professional life there, upart from spells as a rising professor at Stonford and Culifornia in the United States. He is promoted from the Management of the proposed to the proposed of the content of from senior lecturer to the new post, which is additional to the established chair of unutomy held by Professor P. F. Hacris.

#### Half-price books for some

Members of the British Sociolugical Association are to benefit from a scheme that will ellow thom to buy bnoks in sociology and polities at half the listed price. A new book club is being launched by the BSA to collected with its annual conference next March, at Sheffleld University, and to boost its membership. It will sell books in members nine mouths ufter publication at preferantial trues.



NOW easier to study Russian from the interactional attudence of Centrol London for the study of Russian, a personal chair of the schievement in the study of forcerly, head of department of London London Forcerly, head of department of London London

supplamentary benefit poyments. If the cost of their avorage rent of £5.54 is added to the householder's allowance they would be entitled to an overage of £16.40 o weak.

The sample of nearly 700 was drawn from the unmerciod undergraduates of the university. Postgraduates end married students were excluded because it was believed they would introduce a num-



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JAKSI DOM'S diary

## The waste plastic into animal food two-step

hy Cliva Cuoksan

Biochemists at Manchester University Medical Schuni are investigating ways in which some of the quartermillion tons of plastic themen away every year in Britain could be converted in protein for animal feed.

They have developed two laboratory scale processes fur making protein fram waste plastics. Itali involve n chemical step to convert the plastic to compounds that will support interabint growth, fullinged by a binlugical step to praduce pratein from these breakdown

Dr Bernard Bruwn of the Department of Medical Biochemiatry, who is supervising the research, says its progress is being held up by lack of funds. Several

year obroad distinguishes year obroad distinguishes language degrees from most it provides a practical willeh is nure characterisay, dentistry. But whereas dentists must feel a certain lay between lectures on intics and sessions behind noted drill, the modern le undergraduote's "practicark in the foreign country y remote from the literary and trunslation exercise has asselly she) has been doing



there is nothing we can do to sup
20-year-aids falling in love.

And yet this state of permanent
beart-ache makes them less upen
to the experience of France. But
notes all over France. But
Jocah's servitude for Rachel, a test
and a tribulation. Paradoxically Iso going in try in fit in and a tribulation. Paradoxically, a lest and a tribulation. Paradoxically, and a tribulation paradoxically, and a tribulation. Paradoxically, and a tribulation. Paradoxically, and a tribulation. Paradoxically, a lest and a tribulation. Paradoxically, and a tribulation. Paradoxicall

I meet my students (lecteur and lectrice in the university under our exchange scheme). We look for the restaurant one wife enthused over last year, it is boarded up. Why do restaurants which close down provoke such pongs in me? I still haven't got over the demise of Schmidts in Charlatte Street.

We talk phone police bratality



a this month's Modern Language they could could be some for the whole is the could could could could be sold to at home what is required by some forth at

breaking m." Another job is to hand over the list of options for the food year. They have to thoose tom dishes from a varied mean including Vichy France, the improvious painters, the surrealists, Jean-Luc Godard, We introduced these option, three years ago and they are very popular. It enables us, within the framework of a standard French course, to sarisfy a specialist interest in things other than literatore.

Could it be that intenlisciplinary studie, are best pursued within de-partments because—to return to my theme—departments constitute real groups to which people can feel they belong?

#### Paris

The Bobium music hall in Montpar-nasse where Georges Brasseus is singing; his new album is prami-nent in record shops all over France. The show is sold out for weeks cheed but I watch from the wings with o good riew of the ondlence.

Unlike most Paris theatre nudicuces, they oil seem to be French. There is a wide uge span. Brussens sings 30 sangs, including 10 new anes, and the audicuce follows the words intently. It is like some religious rite: they know tha ritual, they morner the words (even at the new songs).

## Reflections Anglophile



Proceedings of the protein from the control of the process of the protein form of the

Afternoon and it is proper I remember, for example de-

of an Osterd college the acute emborrassment of Fuglish academics in the face of minimized, on ched-uled, unauthorized encounters with

Others.

There are many more profound differences between I nelshmen and American, than this, yet what strikes a visitor fact is how the natives react to hom. To my very great surprise, my new "colleagues" in Oxford did not behave as Americans would in their place. They did not come up and "press the flesh", ask eagerly fur my name, my subject, my research interests, where I came from, where I was living at the moment, how difficult my trip nyer was, would I like to come to the house for a drink, for funch, far dinner, to meet the wife/kluls/girl dianer, to meet the wife/klls/girl-friend/et celera, et celera. And to my surprise I found myself very much needing that kind of recep-tian, or at least same comexion with what I taak to be my acadentic

hosts ... Then heyond my awn will, then, rather beyond my awn win, I begon accusting these sliy, haffonsive ilms, introducing myself, resching down to grosp a homisumosisting but unrespansive—ta pump it and thus assura myself that I was neturally there and rectange to he there as great whose existences I was netually there and welcame to he there, a guest whose existence hall been recognized, railfied, legillatted. And afterwords two questlans cama to mind—first, what was cousing this peculiar academic embarrassment that sa often masqueraded as indifference or polsed self-assuronce; and, secand, what required me to behave in such a grotesque, even barbaric woy, to reach out, seize and shoke rejuct-

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Plastle dinners for caws?



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The point of the report presented to the Inter-thalversity Council for Higher Education thereses by Sic Michael Swann's commince last week is that both the universities and the Inter-thalversity Council for British Council and the III' into a referring to staff and students of the higher education within the lighest quality—all disciplines are developmental in that they form a suitable cehicle for the troining that the Council and the III' into a suitable cehicle for the troining and the III in the same of the III in the II and the thereforem need to make would be separately encapsulated."

view, which emphasizes the lact two committees made up of automore the BC was set up just after the mous academics—one for Commonwealth university interchange and be other for academic imprehange second World War os part of the process of "decolonization", is widely field and not least in the fliritsh Council and the Ministry tor twerseas Davelopment.

The council ratices our the high of British overseas educational liaison and the ODM supports the IUC, sits on the British Council's Commonwealth rounding and the IUC, strain the British Council's Commonwealth rounding and there have been no complaints.

IIIC's work to the tuno of £3m a The council observes Whitehalf

advisory ride to that of providing courses for adioinistrators and iniricuting the process of academic

herween the HC and the British Griffiths, director of the IUC, Sir John Llewellyn, director general of the British Council, and Mr Jack
Thormon, older education adviser
to ODM — deales there is "confrom aion ", and indeed these three
are old friends and colleagues, But
Swann neverthelors found "an
answife transportation of take near ranges responsibilities of
take near ranges responsibilities of unsaid hevershelds found and unsaid factory geographical and institutional division between the two councils and recommended to the ODM.

The ODM, however, came in for the other than the

West Indies, Malaysia and Africa ond those at istoce, "Wo believe", the report said, "that the most salisfactory organizational errangements, both for the efficient harnessing of the interests and resources of lightly universities and polyrechnics and for pursuing the broad objective of improving intermutional, but non-governmental, relationships with developing ices of direct benefit in a country's agriculture, commerce or industry. Swant said: "Our view on this point is clear and we hope donors will accept it. Universities are concerned inter alia to produce lightly educated manpower for the cummunity and also to act as resource control of staif end facilities broad objective of improving the for the attempted solution of both this and the next generation of national and intermotional problems: relationships with developing countries, would be to keep this IUC in existence much as is is today; but to extend selectively. its score children to the today in the second selectively. ponetraints on its operational

But nort the committee, guided perhops by Sir Michael Swann and Mr. Griffiths, decided to take account of what was politically feasible. Present arrangements are unlidy; the ODM has come to see little justification for aid finance being used for university linion that properly comes under the "cultural cooperation" heading which to the Public Expenditure Survey Council.

So with abrious reluctance the

Council:
So with obvious reluctance the committee saidt "If come union between the IUC oud the British Council were to be insisted upon by the Government, the only form which would be likely in our view to oucceed in meeting the required would be one which invelved a

a "consciuns decision" about the higher education links with the developing world.

'The particular reason for this is that the IUC's work in Alrha and South-East Asia belongs to a period of filstory now ending. Such a fact that British Connect and Fully represented, but in fact that British Connect as without a body of their men such as the IUC, neademic interests would not be fully represented, but in fact that British Connect services that we committees made up of automorphics.

The IUC was set up to eal the establishmenc of university-local institutions in East and West Africa and other totater caloulal territories. Ever the years it has indigited from its initial academic advisory rule to the population of universities. the ororsens countries concerned before such a merger could teke

exchange herween new universities such as thadait in Nigeria and listificately into the partnership of acidembe equals. The Swanit controller temporal flow attitudes at home to the British and client has changed and blued that and all universities were willing to make the effort that list-out requires.

Sir Michoel's cumulities are postured to the list of the partnership of acidember of the British and offer has eclassically and blued that and all universities were willing to make the effort that list-out requires.

Sir Michoel's cumulities are postured the list of the partnership that the access of higher chically from the raw materials it gets from the eclasors, and hence the pedagogical aid the schools tally have had from British.

The Scann committee seemed to scrept the force of this argument but laid down strict conditions for ony merger. It recommended a com-

lustrantimual division "between the two councils and recommended action be taken.

The committee's conclusion was bedged about with qualifications but it still produced two elternative plans. The first was to keep the IUC as it is and bolster its work liaising between universities in the West Iralies, Malaysia and Africa the ODM.

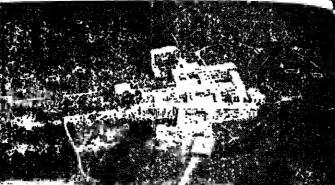
The ODM, however, come in for some criticism for its policy of emphasizing "developmental" needs in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas. As spelled out by Mr Prentice and in educational aid overseas.

walk of life, in the community.

"In short, we would dopline the occi-rigid application by aid donors of concepts of 'reference' or of 'dovelopmental subjects' in selecting activities and people for external subject at the highest levels of scholarship and calacotion."



Students oversess : paironage or partnerskip?



## Fees fight starts with

cli-defence; others use them as future generations.

"The Closing Circle focused on the design of the production system es the design of our environmental sciences at Washing University, St. Lonis, Missouri, director of the university's difficult numbers in the little of Natural and the control of the university's difficult numbers in the control of the university's difficult numbers in the control of the production system es the origin of our environmental problems, but after fundamental theory of the university's one of the production system es the origin of our environmental problems, but after fundamental theory of the production system es the origin of our environmental problems, but after fundamental theory of the design of the production system es the origin of our environmental problems, but after fundamental sciences at Washing University of the design of the production system es the origin of our environmental problems, but after fundamental sciences at Washing University of the production of the design of the production system es the origin of our environmental problems, but after fundamental sciences at Washing University of the production of the design of the production system es the origin of our environmental sciences at Washing University of the production is the design of the production system es the origin of our environmental sciences at Washing University of the production "The most difficult problem is

director of the university's stre for the Biology of Naturel tems, falls firmly into the not to analyse the production of energy but its usos, and this requires a total analysis of the production

The crucial wall that Commoner ettempts to breach, and of which this evont was a cymptom, is that which dividos eclence from politice.

science, pass up the economics. The bank extra le displayed in the lecture room. His presentations of complex statistical deta—for example, of the energy ioputs and outputs of the energy ioputs and outputs of the energy ioputs and outputs of Amorican egriculture, and



The link was made implicitly in The Closing Circle; in The Poverty of Power It becomes explicit that his terget is American aspitalism.

"In dealing with both the energy crisis end tho current economic crisis, what wo are really dosling with is the substitution of lebour by capital", Professor Commoner ssys. "My guess is that so long as cepitelism involves the froedom of the individuel to maximize profit, we need e mirecle if it is olso going to mean meximizing the destrable use of energy."

Such phrasos heve drown predict-Such phrasos heve drown predictable heedlinos such os "Industries grob profits, wasto energy—Commoner", and "Ecologist blemes cepitalism for energy crisis".

American reviewers have elso respected with scepticism: Time cleimod Commoner was "botter as gadfiy than economist", and the New York Timee Book Review adviced ite reeders to "road him for the science, pass up the economics".

for o centralized planning mechan-ism through which a coordinated energy policy can be articulated. In practice, this means the nationaliza-practice, this means the nationaliza-tion of the energy industry; Britain's main mistake, he elaims, is to have "nationalized the least pro-fitable industries, and then retain the criterion of prolitehility".

The moin purpose of his latery tion into political debuto hes been to raise discussion of critical issues bout oncrey use and the economy, he says. "I do not think that socialism is the Issue of the dey to the United States; people are

"But you need the mirror of socialist anelysis to hold up to problems. In my book I have been less coocerned to present e detailed progremme for the future than to dlegnose the present. I feet I have raised the main issues; the next step should be their substouting

certainly he lo no etranger to the corridors of industriol power. A busy schedule since the American publication of the book last opring has ranged from three days spent with the corporato planners of the General Electric to his appointment as a member of the advisory council to the Secrotary of Commerce, former ambossador Mr Eliot Richerdson.

But whatever the reaction to Professor Commoner's political views, there is nothing but praise for bls ebilities as a teacher. The Poverty of Power, like his earlier books, is characterized by a rare lugidity of explanation lucidity of explanation.

The same ekill le displayed in

S devil's advocate for new look at energy use into the progromme of the British Lebour Perty.

The basic need, as he sees it, is for a centralized planning mechan-Professor Commoner is concerned that his multidisciplinary approach to research should be extended to teaching, complaining that must universitles produce etudents who ere unable to link their training with the complex problems that they will fare in the real world.

"Our problem-based approach is a missing ingredient in the experi-ence of most students, and even in schools of engineering end sgranous, for example, in which noople ore becoming increasingly aware of the need to consider the environmental impact of euch activities, teaching developments have been far from adequate."

The centre has already mounted several courses on environmental topics, including a six-week course for groduates from Third World countries exploring the relationship between the environment and devo-lopment, looking both et its techni-cal and its social ond political

Professor Commoner is keen to encourage such developments, as he is to develop the propagande work of the Scientists Institute for Public Information (SIPI) in New York, of which he is chairmen of the

Yet he remains e looer in the best Amorlean outcast tradition. He fits as uncoslly into the ecientific end academic sceno as into the poli end academic sceno as into the political one, but relishes the freedom
this gives him to apply an acuto
sciontific mind—he established e
solld reputation as a plant physiologist before turning to environmental
debatos—to sensitive parto of the
establishment.

Gadfly is too lightwelght en imege end revolutionary is ineppropriate; devilo edvocate would be a bet-ter description. And even they can

The service of specific production of the service of the service of specific production of the service of the serv

Overcos students, however, are not expected to be deterred by the highest feed as much as home students, however, are not expected to be deterred by the highest feed as much as home students, however, are not expected to be deterred by the highest feed as much as home students, home gosteredutes face, a result of the feed of the

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# **Marler Haley**

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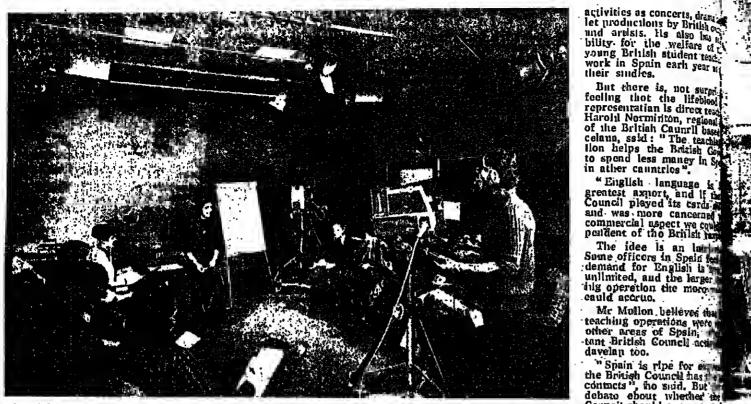
## Viva Inglés-the British Council talks money in Sparring

faces an enforced period of auste-thy, h has been forced to launch conditte rearguard action to protect he work urerseas -- particularly

In the 1950s the Council's funds for cultural cooperation with Europe were cut back diamarically and it received a directive to expand by work in the undersleveloped world. It was only in 1972 that Mr Geoffrey Rippun, then Chancellor of the Duchy of Lancoster, nonconced that the Council was to receive an extra the Council was to receive an extra t.i.5m, spread over four years, specilically to promote and strengthen its programme of cultural and cilucational exchanges with Britain's Emonean neighbours.

The move, designed to coincide with Britain's entry into the EEC in 1971, was eagerly released by the Crancil. But last year came the rhilly news that the "Rippon package" would not be renewed. It was followed by a Treasury Instruction that the Cauncil should account hint that the Cannets similar account again for the money it spent in the developed world, which leaught new fears that work with Western Europo, at least, was again in jec-

Writing in the 1974-75 onmual report published early last year, for John Lieuvellyn, director-general of the Council, said the



Spenish students learning English at the Instituto Britanico, Madrid, under the walcifful eye of the new closed-circuit television system.

A page open to all those

who feel they have

something of value to say on topics of interest

and concern in higher

## Culture is key to reasoning

Mr Patrick Berninghan's recent article (THES, November 5, 1976) fails in my view to substantiate the mechanical engineering students maln point that he is apparently trying to make, namely that students from the Indian subcontinent and ability and mechanical reasoning to students af British extract.

I have olso been involved in tea-

and have farmed the subjertive Impression that Indian/Pakistani/Sri Lankan students tend an average to fare less well to activities requiring three-dimensional thinking. Haw-ever I feel that Mr Rormingham hav

ing three-dimensional thinking. However I feel that Mr Iterminghou have only nurched the tip of the problem, and that his paper begs more questians than it answets.

The problem is that the tests used in his study (the space relations teal and the mechanical recoming test from the Paychological Corporation's differential epthyde battery) suffet from two major shorteomings when used with students of fareign and part of the test is minimal.

Indian. Pokistani and Sri Lonkon or interest; as only interest; and personal circomstances on interest; as only interest; as o

extract.

First they require inastery of the English language far carract administration, and secandly thay ate nat culture-free. Those factors make the whole canceut of asing "narms" for camparison of rasulta in his study highly suspect. For how is the "normal", student to be defined?

My own researchas using theed

My .oiyn researchas using timed tests, although limited in acopu, have bean sufficient to convince

after students were all in Leicester Byen concepts such as perspective after students areas show inferior spatial ability and mechanical reasoning to students at British extragt.

I have olsa licen invalved in reaching mechanical engineering students from a wide variety of cumpress of origin for a number of years, and have farmed the subjective engineering is still in progress. However, a comparison of students of origin for a number of years, and have farmed the subjective energy of the students in the sample of the sample of students of the sample of students of the subjective results. There is some evidence from my results to angeost that the test scores correlated to some extent with the longth of time a foreign student has been concepts.

on course, the graups considered and the tests used ara in no way comparable—the significant festure emerging fram both cases is that narms quoted for British nr American students are not volid when testing other notionals.

A second factor is the vexing

speakers is informative (Table 1). resided in Britain; a low-to-medium I have senamed out students of Indian. Pokisani and Sri Lonkon origin as a matter of interest; as linge sample; the student's intelligence and personal electromstances

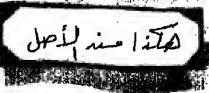
tests?", remains unauswered.
Mr Bermingham's test programme was probably adequate for his purposes: It indicated a student's weakness in the area of etudy with which

#### Malcolm Rossiter

HUD VIAD HU	Cathaga	N19					
-	Tatul S	anıple	All Fo	relgn	Ind/Pak/Sci t.		
Test Part -	1	11	1	H	1	11	
Group Size	oun Size 151			5	17		
Mean Score	37.1	51.2	27.5	39.3	27.5	39.8	
St Deviation	8.6	10.9	8.1	12.5	8.8	14.4	

	All Foreign	Ind ak/Sri L
Bermingham: Mechanical Raasoning	36.5	.11.0
Space Rolatinns	47.8	42.8
Rossizer: All- Part I	68.7	68.7
Pine 11	717	72.6

The state of the control of the cont



## MOTICE BOARD

been appointed to the chair of organizational behaviour in the school of hidustrial and husiness studies if the University of Warwick.

ar Stument University, California.

Prolessor Cecil Gray, prolessor of anaesthesia and dean of the faculty of medicine, University, has been awarded the title of entertins professor on his retirement from the university.

resity.
Dr T. P. Wiseinan, at present leader in Roman history, Leleester University, has been appointed to the chair and head of die department of classics, Dinhead of the department of classics, form-versity of Exerce.

Are Christopher G. Thorne, reader in international relations, Sussex Univer-sity, has been promoted to a chair in

Professor K. F. Wallis, ccader at the London School of Economics, has been appointed to the chair of econometrics from October 1 at the University af Warvick. He succeeds Professor Pyall who became director of research at the World Bonk.

Dr Deunis Elwell, principal lecturer in physics, Portsmouth Polyreclinic, has

Agriculture-E20,814 Iron the ARC I Agriculture—220,814 from the ARC in support of an inrestigation entitled "Studies on inhibited development to Haemanchus comortus" under the direction of Dr R. J. Thamas

direction of Dr R. J. Thomas,

Agricultural blochemistry—£10,017 from the ARC in support of an investigation in education; D. M. Gorringe and P. B. Pynaent (bloingical sciences). Jimilar research in education); D. M. Gorringe and P. B. Pynaent (bloingical sciences). Jimilar research in education); D. M. Gorringe and P. B. Pynaent (bloingical sciences). Jimilar research associate: D.-E. Forres! (environmental sciences). Benlor illustrator: J. W. Middlemiss 1East Anglian similes].

Essex

[Agricultural blochemistry—£10,017 from the ARC in support of an investigation the small intestines under the direction of Mr R. C. Seeley, £3,654 from the small intestines under the direction of Mr R. C. Seeley, £3,654 from the small intestines under the direction of Pantothenic acid biosynthesis in the digestive tract of the ruminant under the direction of Professor D. G. Armstrong.

Agricultural blochemistry—£10,017 from the ARC in support of an investing the support of an investigation the ARC in support of the investigation "Pantothenic acid biosynthesis in the digestive tract of the ruminant under the direction of Mr R. C. Seeley, £3,654 from the small intestines under the direction of Mr R. C. Seeley, £3,654 from the ARC in support of an investigation the ARC in support of the investigation the small intestines under the direction of Mr R. C. Seeley, £3,654 from the ARC in support of the investigation the small intestines under the direction of Mr R. C. Seeley, £3,654 from the small intestines under the direction of Mr R. C. Seeley, £3,654 from the small intestin

Jaka Grants, 1495.

Psychology—Dr. P. H. K. Seymour £5,353 from the SSRC for research >

Political and economic planning— J. H. M. Pinder and A. Smith—C4,7.17 from the SSRC for research on govern-ment subsidies to the newspaper and periodical press.

Naval architecture and chipbuilding-64,576 from the Midstry of Defence to support of the investigation "Optima structures for sorface warships" unde-tic direction of Professor J. B. Cald

Newcastle upon Tyne

To cope with the problem of starting university courses from a reneonably acceptable level, either the university courses themselves must become more adaptable to the urbul sinte of preparation of individual students, or some other way must be found to easo the trubalton into tertiary culturation.

The dentit of the problem is an Agricultural biochemistry and ogriculture—E8,747 from the Mest and Livestock Commission in sopport of an investigation "Studies to the physiological control of growth and carcess quality in large white pigs" onder tha direction of Professor D. G. Armstrong and Dr W. C. Smith.

Agricoltural blology—£15,732 from the ARC in support of an investigation. "Histological and blochemical basis of dorable," resistance to yellow rost in wheat "under the direction of Professor G. E. Rossell.

the nepth of the problem in one discipling has been demonstrated by the findings of the Physics Interface Project, a consaction of six university physics departments set up in 1970 with linancial support from the Nuffichl Frandshim. Agriculturoi economies—£4,450 from the Countryside Commission in support of an investigation "Agricultural change and conservation in the orban fringe" under the direction of Mr K. J. Thomson

rom the Natilchi Faundalian.

This group of physics departments—mannely, those or Birmingham, Cardiff, Cheisea, Keele, Surrey and Yurk—collectively set about finding out what each newly carolled first-year physics andem actually knows of the subject at the start of the university course. university course.

The depth of the problem in one

LOCCATION SUPPLEMENT

sixth form to that at university

Much concern has recently been expressed about the problem of students entering university without the skills or knowledge essential to their courses. This concern is

frequently associated with the sceningly continued and sometimes radical changes in A-level syllahuses

and examining methods which have taken place over the past 21 years

In the last decide, for example,

Such changes have brought with them changes in the kinds of knowledge and ekille with which etudems are aquipped by the time they reach tertiary education. It is this, allowed anything, which has undermined confidence regarding standards, and which has complicated on already complex, multi-dimensional discontinuity between school and university.

rersity.

the Nuffield Inflience has played a significant part in changing school curricula, both in relation to approaches in science teaching, and in changes in the actual content of syllobuses.

Bryan Turnbull looks at the transition from physic THE TIMES HIGHER EDUCATION SUPPLEMENT 21.1.77

This was done by using specially designed multiple-choice adjective lests which have been progressively refined in the light of some six years' experience, and an new loring made available to schools as well as to universities and other institu-

tions.

(the of the primary nins of the project was to establish what kind of importy would produce information about students' prior knowledge and obdities which would be of real use to both the students and the independent students. university teachers. A second cipully important aim was to find ways and means of help-

ing individuol students who might be found to have significant gaps in their knowledge and understandng of bosic physics.

It was not the aim uf the project to reorganize first-year teaching, and because of this its activities had to fit into an existing situation in each of the six constituent deportments. The constraints that this placed on the project determined in practical terms how these aims could be achieved.

could be achieved.

The diagnustic tests and selfteaching moterials resulting from or
the project therefore have the ailvantage that they can fit into olmost
any teaching situation where the
subject matter and level of treatment ero oppropriate giving them
o great deal of flexibility and opplicshility.

The project, although coordinated from a central headquorters in the physics department of University College, Cordiff, represents n college. college, Cordiff, represents n college, Cordiff, represents n college, Cordiff, represents n college contributions of a much higher dividuol or separata experiences. For every item groduced has received contributions of one form or tho scheme.

This was done by dividing and the contributions of the project's all tests and self-teached than 10 per cent than 10 p

ch yen ar abaut this time, in an Philocontere building in Basle normally defer building in Basle normally defer industrial fairs, the Eoro-Paulin Broadcasting Union holds a Mar for educational broadcasters. This year's sentinar dealt be "partnerships" (between adcasters, other media, and er adult education sgencies) and fettes entered into to provide the series of continuing education for hits. Brian Groombridge looks two recent conferences on the relationship between broadcusting and continuing education or the first time ever (this was fourteenth annual seminar), the ye participants included a group

ve participants included a group con-broadcasters. Thus the tenni m Britain included the ILEA (clallst. In adult literscy, the setter of the BBC's television appoint in the national literacy eme (much applauded in Basle), i others from the BBC and Indefidant Television.

There were also university prasors from Canado, a Ca-op edu-Venobles Report, the final report of the Open University's Cammillee an Continoing Education, was pub-lished in the full before Christmas while both these conferences were

in session.

It deals with much the same issoes, and is too important and too gravocative to be ignored. And the Annaa Report on the future of brosdcasting, thus later this year, will sorely have sumething to say ubust the grawing demand for an enlarged and stubia continuing from broedcasting to continuing from broedcasting to continoing education through upon learning

was generoosly manced by the Belglan Government, at a time when
such aponsorship is almost a thing
of the balmy 1960s. The Belgion
Minister of Dotel Cultoro and
Flantish Affoirs, Mrs R. de BackerVan Ocken, showed a good deal
more than ceremondal interest in the
proceedings.

A little ignorance is Europe sounds the all clear an identifiable thing or the open college To achieve the necessary scale and flexibility now needed, mass methods—including mass media—have to be used, and these may be at odds with the individualized purposes and processes of education itself.

Creating the necessary parmer-ships, or the level at a specific teaching enterprise, or at the highest level of educational plan-ning, is traught with practical problems of many kinds, and not without its political risks, especially in countries proud of traditions of diversity in higher education.

An open oniversity—a newly established, independently consti-toted academic foondation, making use of distance teaching methods—is not fell to be the way forward. However cost-effective, in terms of onit costs, it would be too expensive.

Moreover, there are thought to be

acceptable) jubs to be done, especially with such resources as braudcatting, then providing adults with apportunities to sequire first de-

grees.
Consequently, many committees seem to be esponsing an open college concept, a notion virtuelly sysonymous with the creation of multi-media systems, and allowing for the creation of new allowers old new forms of parmership between already existing institutions.

olready moutioned—these new port-nershipe are meant to achieve new cducational objectives, in new ways, with new publics, at, by and large, something like old levels of expen-

ditore.

This seeme to be the direction in the Nordic countries, in the Low Countries and, to a lesser extent, in Germany. The pattern elsewhere is harder to discern, nithough the French, for example, were vigorously involved in the Brossele-Bosla discussions.

There are important issues to be

ously involved in the Brossele-Bosia discussions.

There are important issues to be clarified. For inatance, tha Open College in the Netherlands (enduring a prolonged and painful gestation), is axpected to provide educational opportuoities for deprived groups in the population.

The same social priority is reflected in the latest course offered for last week by the Belgian Open School: Klare taal (clear speecb), a course to help Flemish speakers who may need to improve their oral ebility and their mutual intelligibility.

The television sories fectures ensmiable but rather inerticulate poetmon from Bruges called Walter Willems, and there are associeted redio programmes, e handbook, and opportunities for clasework and honework.

The success of the Open University, however, depands largaly on its students being so highly motivated that they are even prepared to rester a complex and integrated.

that they are even prepared to master o complex and integrated multi-media system, as well as what the system teaches. The educathe system teaches. The educationally deprived ore much lass
likely to apply themselves so
attennously. So will educationists
and politicians find their expectations disappointed and turn sour ?

These and other matters—creetive and practicable problems of
organization and logicities, course
teamwork, convright, and so on—
preoccupied the pructitioners

brought together at Bruseels and Basie.

Thare was eleerly a dasire, at both these moatings, for furthar contact ond mutual information—perbaps facilitated by an alalogous partnarship at the lavel of the EBU and the European Bureau thamselves—in order to avoid some of the pitfalls of dislinelonment that may he ahead.

They will oeed to go on learning from each other, and, if British is to develop an open college and an open school as part of an odequate system of post-compulsory education, and contribute from its own exceptionally varied experience, we shall need to kaap in touch with projects in other European countries. countries.

The outhor is director of axtro-mucal sludies of London Univer-sily, and was until recently head of educational programme services the Imlependent Broadcasting

## How older students will keep the numbers up north of the border

Stanley Johnson discusses implications of the changing age-structure of students entering higher education institutions in Scotland

Forward planning in Scottlsh universides and colleges of technology, especially in present economic conditions, requires occurate foracoste of student numbers. Though economics may infloence the numbers of pupils who obtain qualifications necessary for admission to higher education, the basic factor remains the number of live births in the relevant veora.

This factor does not sucm to be clearly onderstand ar rutionally opplied. The first essential is, ilierefore, to ascertain the relationship between numbers of births and stodent nombers, assuming all other foctors remain constant : to try to get a " pure coltiue", so to speak.

Birth figures can be used to cal-eolate with grast precision in od-is therefore u good figure to take vance the numbers of children who will enter primary school for severni years. If migration rotes ore known, he total primary school population in uny rogion can be easily end accurately culculated.

os numbere in the various age groupe are not the complete clus to numbers entering on courses,

Most students in Scotland are assumed to enter higher instinitions of about the oge of 17 or 18. This is sufficiently accurate for ganeral statements, but dangerously wrong for planning. In the current session, the ages of naw undergraduate entrants to full-time courses in one such institution ran-ged from 17 to over 50, and 22 per cent wera agad 21 or over.

per cent wera agad 21 or over.

Thus a fall in the numbers of live births at fall in the numbers of live births only begins to be reflected in lowered admissions 17 years leter, but continues to effect admissions for many years afterwards. It also means that any related decline in total numbers of students is not in numbers of ilve births. The recuits of applying the model suggest that total student oumbers will not fall bolow present levels until 1987. The decline by 1992 is likely to be 16 par cent on 1976 figures, end will continue thereafter, as 1976 births appear to be falling about 2 per cent below 1975. Now admissions on the basis of this model should not fall below 1976 lavals until 1983, although the numbers of 17 and 18-year-olds will drop in 1981-82.

failura rates and lengths of courses, accurate prediction of total numbers extending o higher institution is impossible. It is, however, possible to create a model for that Institution on the basis of current courses by analysing the oges of oll students in attendance,

group will tend to be to Nated if logy.

the number of hicks for their year of birth were high, and will tend to be depressed if they were liner in a year of fewer hirths than "standard".

The model therefore needs to include a correction to produce a theoretical number of entrance based on a standard birth-rate. In the last 30 years, live births in Scotlant love ranged from 70,000 os standard

Ench age group among the expected entrants can then be adjusted from the "standard" based on the corrected 1976 model by applying the total of live birthe in the relevant year.

rately culculated.

It is less easy to predict the total numbers who will be receiving social students in 1976 there were 66 born in 1959, when the births totalled 99,251. For the imme. Intokes at around the age of 11 can be calculated, but a new factor, the "staying-on" rate, affects numbers at the upper end of the eccoodary schools.

For higher education the task of forecasting is even mora difficult to achieve with satisfaction, as a chieve with satisfaction, as a chieve in the washous age.

become only 173 on the 1968 actually birthe of 94,786. As only 85 in every thousand of 1976 etudents are aged 26 or more, little error is created by taking a five-year over-age of live births to apply globally

Separata figures con be calculated for each of the other nine younger aga groups. The sum of the 10 figures gives the annual totel student numbers forecast from the 1976 figures, corrected for changes in numbers of live birthe.

It will be cleor that chonges the pottern of courses, entry qualifi-cations, length of period of study, prospects of employment or lave of student grants, and so on could introduce other causes of variotion.

This has the defect that the The outhor is lecturer in manog

Theee ora subjects for sensrote

#### 1101 % OF 1976 STUDENTS ENTRANTS NUMBERS OF NEW ENTRANTS AND OF TOTAL STUDENT POPULATION IN SCOTLAND RELATED TO NUMBERS OF 18-YEAR-OLDS YEAR OLDS 1976 -78 80 82 84 86 88

Professor J. R. Muiryne, reader and licent of the English Increature department at the University of Editioningh, has been appointed to the chair of English literature at Warwick Hulver-

Pratessar A. M. Petilgrew from the European institute for Advanced Studies in Management, Brussels, has

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Appointments Universities

ecturers : Dr J. S. Shaw (geology); Dr D. J. Songer (psychology); Dr F. I. Woodward | boranyl.

Civil enginecting—Dr Hannani—£11,773 from the Department of the Environment, for work on fibre-reinfarced concreto. Dr B. K. Menzles—£25,012 from the SRC for work on the effect of sampling disturbance on modell of salls. Mr D. Beckett—£3,500 from Automaton Building Components, Europe SA, for work on the dorahility of punched metal plate connexions.

Electronic and electrical anglescence. Electronic ond electrical engineering— Mr W. Mulley—£7,763 from the Min-istry of Defence, for work on the auto-mailc realing of manual mease; £9,998 from the Ministry of Defence, for work on repiny and analysis system for Omega flight trials data.

Meclisideat engineering—Dr D. G. Ed-wards—£15,879 from the SRC for work on pressure wavce produced by pipe explosions.

explosions.

Meiallucgy ond molerials ieclinology—
Dr J. Mackowlak—£6,400 from the 5Rc
for work on the thermodynsmics of
surface reaction. Dr Z. Sykopiak
£4,700 from the Department of Trada
& Indostry, for work oo the ducillity
of austenitic steel. Dr J. Castic—\$12,000
from the international Copper Research
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brass condecsor tibes.
Physics.—Dr S. Cortlett for several

Physics.—Dr 8. Corblect—£3,879 from the Ministry of Defence for work on Radoma aberration.

Blochemistry.—Professor D. V. W. Parke—£41,307 from the MRC for work oo carcinogenic potential of chemicols; Dr J. Chskraborty—£17.311 from LIPHA (UK) for work on the protective action of, cantobalin against liver damage.

Chemical physics.—Professor V. S. Griffiths—£34.973 from the SRC for work on multiport scattering parameter oncasoring system.

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Lingoistics and international studies.—
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Noticeboard is compiled by Patricia Santinelli and Pauline Gamble

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That is certainly the political expectation in other parts of the say what aspects of a significant contended and net certainly standard the security to a say what aspects of a significant contended and net certainly standard the security to the say what aspects of a significant contended to say what the success meeting of the security to the security of the s

inches experimental inches the student is all our observations or manners using very simple such as plastic leases About a dozen or a confirely laborotory better paratively more sophiment being required. Extra training follows a furnity and the confirmation of tural pattern to the another from everyone involved in the scheme.

This was done by dividing up the activities between a number of comnaratively small, sublect-hased working groups, each dealing with o particular spect of physics, and cochroling stuff members from old the participoting universities.

Thus a wido variety of viewpoints as well as needs were automatically built in to the scheme, a koystone store contioned hormonious relationships between the participonts.

Important as it is fur university teachers to have a cleir idea of what their students are alde or making to do, it is equally important for the students are alde or making the students are alde or making their students are alde of what is expected of them. One of the

The Tteres Higher Education Supplement (London)

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## Carnegie survey confirms campus conservatism

Education.
In 1975 some 71 per cent of studyents said they were "sotisfied" or "fery satisfied" with their colleges. This is more than in 1969, but even then, at the height, of campus unrest, more than 60 per cent said they were satisfied.
Although the proportion of undergraduates expressing leftware

strong support for the proposition that "any institutions with a substantial analyser of lilock students should offer a programme of black students if they wish it." But the proportions appropriate the proposition of the that "any Institutions with a substantial number of block students should offer a programme of black studies if they wish it." But the proportions agreeing, even with some reservations, that "nore minority gramp madorgraduates should be admitted to my collage cyen if it means relaxing normal academic standards for admission", have fallen from 29 to 22 per cent among undergraduates, from 37 to 27 per cent among graduotes and from 37 to 27 per cent umong tanchers.

There survey also canfirmed the growing interest in vocational transmitted in vocational growing interest in vocational growing interest in vocational transmitted in vocational strength of the survey most limportant to them.

Another main fluding of the survey was that although very large proportions of all threa graups in 1975 said that "teaching effective that were more likely than they were in 2969 to clta "training in skills for an occupation" and "a detailed grap of o special field" as the educational objectives that were most important to them.

Another main they wore in 1969 to clta "training in skills for an occupation" and "a detailed grap of o special field" as the educational objectives that were most important to them.

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Another main the survey also canfirmed the growing interest in vocational to como source.

The general public impression of an increasingly conservative out and stations of the candens in public institutions still increasing an increasing of the controversy, especially in tax some 175 public institutions still increasing an increasing anticipation over \$20n—more than the 632 private still as success of the assurant given worth over \$20n—more than the 632 private still increasing anticipation over \$20n—more than the 632 private still increasing anticipation of increasing anticipation over \$20n—more than the 632 private still increasing anticipation over \$20n—more than the fact that the fact that the fact the fact the fact the fact the fact that the fact

in recident neademic reform has wanel.

The survey of 25,000 lecturers, 25,000 indergraduates and 25,000 professor Trow's report vividly ognature students was directed by Professor Martin Truw from the University of California at Berkeley, and was sponsared by the Carnegic Council on Policy Studies in Higher Council on Policy Studies in Higher Council on Policy Studies in Higher ont of five undergraduotes in 1977 some 71 per cent of students and the height, of campus understandiates and proportion of undergraduates as sponsared by the Carnegic Council on Policy Studies in Higher Council on Policy Studies in Higher onto five undergraduotes in 1959. Among on the proposol earther that has been a major concern of council on Policy Studies in Higher Council on Policy Studies and I students in the deciment of Council on Policy Studies and I students in Professor Trow's report such that the word that the trust of Cannetics and I students in the ADUP, in evidence at a public that heads on the proposal of the Policy Studies in Higher Council on Policy Studies and I students in the Council on Policy Studies and I students in the ADUP, in

#### Protests grow over tax perk proposals

The proposal by the Internal Revenue Service to levy income tox on the free mition given by univer-slites to the children of thousands of university teachers has caused howls of academic outrage (THES, December .IJ.

Many universities do not charge tuition fees for the children of university tenchers—often with teclpracal arrangements between colleges. According to the National Centre for Educational Statistics about 27,000 students are collected free under this scheme.

The regulation would affect about 800 colleges,/most of them private. Free fultion is one way institutions are able to attract good teachers at computatively low salaries, and may change is seen as a threat mainly to the private sector.

Official stotistics, however, shaw that some 175 public institutions also affered unifor remission lost year worth over \$200n—more than the amount given by the 632 private institutions that hod similar schemes. The regulation could affect about

A major study of foreign students in Conada has been commissioned by the seml-governmental Conadian Bureon for Interlutional Education. It cuates at a time when the whole question of aversess students and thair tultion fees is of increasing controversy in Conada.

The study will be in the control of the students are the success. Considering and general

The study will be in three parts:

an analysis of statistics, interviews
with foreign students and a number
of monographs. The fludings will
be coordinated into a full report by
Dr Myer Horowitz, condemic vicepresident of the University of
Receivers

Poreign students are a hot poli-Foreign students are a hot political issue. In the past fow months there have been a number of provincial and federal government actions which suggest increasing restrictions: visa regulations have been righteed up by a recent Immigration Act, a growing number of universities are setting ceilings on the number of foreign students they occept, and that two provinces of Cotario and Alberta are considering differential tuition rates for foreign and Cauodian students.

The problem is that Canada does

Toronto, hove the largest number of forcign students.

The largest group of visa students como from Hungkong. They make up 26 per cent of tho total, and have increased by almost a third in the past three years. This influx is portly explained by the fact that only a few thousand students are able to enter the two Hongkong universities.

Foundation trustee

Although the ethical problems of the electrist in defeuce have been debated o some extent, it is important to remem-ier that his problems are not so different rom those of the citizen at large, onti

There can be no question that the first uty of any government must be to do bast to ensure the physical security of lts citizens. It follows that it is narime duty of citizenship to ossist, brough the political process, in the haping of the defence policies of the

it may be odvantageous to discuss

Hermann Bondi

THE TIMES HIGHER EDUCATION SUPPLEMENT 21.1.77

The problems of defence lie in the Henry Ford: "the Penson nascapable fact that a policy aimed at a creature of capitalism," aducing one kind of risk almost always

The record-breuking strike quent risks together. Indiversity has ended a sat. To disagree with the palicy of the as an oct of desperation or irrationality. Complete virtary for the transferred and occordingly to oppose it. In such circumstances can we trust an ended a sat.

The subject areas attracting the mast foreign students are the social sciences, engineering and general general arts and sciences. The two guebce, McGill and Concerding the demands of the teachers a dirty business best left to others. Only point which the administracy be natural to want to do so, for gether with the Hulversity of Toronto, hove the largest number. The investigation of foreign students.

Agreement came alter a sigree with it ond support it politically ventions or by feelings of revulsion and therefore to refrain from using chemical accordance in the demands of the teachers and additional accordance and therefore to refrain from using chemical accordance in the reference of the refrain from using chemical accordance in the reference of the refrain from using chemical accordance in the reference of the refrain from using chemical accordance in the refrain from using the interest in the refrain from using the interest in the refrain from using the interest in the refrain from u sulary scale should be intoba failure of defence policy, war, is indeed

replace the present system an exceedingly unpleasant thing to think dividual agreements.

The 107-day-long strike willlingness to shoulder one's responsimality on the question of chility as o citizen for the direction and mental power and authors execution of defence policy.

There was don't a general dealing the penagene, the proposed and proposed and the penagene in the penagene in

theory Ford II has resigned us a trastee of the Ford Foundation, the combined by the combined by the strongly criticized the foundation of the form the strongly criticized the foundation of the form the strongly criticized the foundation of the form the strongly criticized the foundation for spreading its unner thinly, and for not support time and the system of free of capitalism." Mr. Ford said. "It is and the foundation of the foundation

FOR THE ADVANCEMENT OF SCIENCE

thought up a new, nasty and therefore excellent way of killing millions". But this is not at all what life in defenre is like. It is necessary to think ulmut existing and potential threats, about the ways in which an enemy cauld seek to coerce us to his will by threatening to destroy One asks how we ran hest ensure that we are never put into such a situa-

Perhaps an example might clarify the complexity of the problems with which one has to deal. Chemical warfure has u portirular pastiness about it. After secwho were attacked with it in the First World War, most of the nations in the world have become parties to the 1925 Genevo Gas Protocol.

These notions have committed them selves not to be the first users of phison gas in an international conflict. Apart from this legal constraint, there are powerful psychological barriers against the use of chemical ogents, so I shall Laval Strike of chosen policy reality and in order it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents, so I shall concentrate on the question of whether it is necessary to contemplate the use of chemical ogents.

As long as NATO is reasonably strong, nobody would attack our forces except Agreement came alter a mid otherwise. What can hardly be called therefore to refrain from using chemical British draft recently tabled of Geneva, we commt ignore the possibility, and we must take steps to diminish the tempta-

First, wa can use direct defence; that

tion provided is effective? Surely only by establishing, through theory and ex-periment, which potential chemical agents the anemy might use, and then testing the effectiveness of an equipment against these agents. Even this must involve the manufacture, on a vary small scale, of the agents thamsalves. If one wanted a retallatory capacity,

This sounds innocuous and inoffensive. but how can one be sure that the protec-

large-scole production would be neces-sary, together with deployment, lowering the barriers much further and moking the enemy fear that we were seriously contemplating the first use of the weopons. Where does tha balonce of risk lia? The United Kingdom choice has bean to go for deterrence by protection, while working for international treatles (properly inspected and enforced) so that the apectre of chamleal warfare may aventually be banished totally.

Where in all this does the scientist stand? Should he go on strike if asked to work in this field? Should he try to coeroa his government, by his refusal to work on these motters, to adopt a policy (whatever this may be) more to his likng? Quite apart from the virtual impossibility of getting scientists to act suffihe devises protective clothing and so on. their political ylews is as wide as that of

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Andrew Beisey: Is Hannes Alfven's view myth or history?-VII

I. C. Poikinghorne: Potshots at research puddings---VII

Magnus Pyke : BA news-Viil

vail over the policy for which a govern-ment is responsible to the elected representatives of the people. Surely the sclentist's duty is not to set himself up in opposition to the politicion,

the general public), there con be some-

titing undemocratic and arrogant in an

ossertion that one's own views must pre-

No 2, January 21, 1977

but to form a team with him, working hard to moke those carrying the political responsibility understand the scientific situation, pointing out tha dongers and risks he knows about and (which is mora difficult still) explaining where the inevitoble gaps in his knowledge lie.

The etbical duty of the scientist lies in explaining, in making the big effort in time and thought to make clear the essentials and especially the risks of any actions, their foreseeable consequences and the oreas where tha consequences cannot be foreseen, but where yours may be appropriate.

His political judgment is an better than that of any other chizen and his morol convictions are as important, naither more nor less, as those of anyone olse. It is solely in his scientific knowledge and independent the state of the second to be solely in his scientific knowledge and independent to be solved to be so judgment that he has anything special to give. This he must give, with the greatest precision and clarity. That is his inescapable duty.

The temptoton is ever-present to shada his judgment so that his advice assists tha project ho likas technically, or which fits in with his political or military leanings. These temptations he must resist, Equally, be must convey the views of other scientists whose judgment differs on a point of scientific debote. Science must not be presented os monollthie or os mogic, but as human and orguable.

One's obligations of citizanship one one's duty as a human being can be well discharged in defence science but only provided that one does not regard ona's special scientific qualifications os confer-ring a special standing ond understanding in matters of public policy.

Sir Hermann Bondi is chief scientific ad-viser to the Ministry of Defence.



BRITISH ASSOCIATION

## DRITISH ASSOCIATION Photobiology. for food fuel and fibre

by D. O. Hall

Light activates chlorophyll (photosynthesis), the retina (vision), DNA (mutations), phytochronies (day-length control), the eye and hypothalomus (orientation and unvigation in animals), the skin (tanning and cancer), and a number of miter similarly important reactions in bloto w. In this article I want to try to out- this plant material is not generally where line the possibilities that photobiological energy conversion might have in providing food, fuel and fibre in the futurethis is a recently revived concept of an old process, namely photosynthesis.

Sinco the change in oil prices three years ago there has been a renewed interest in solor energy systems as nne of the olternative mechanisms for providing energy now and in the long term. Solar energy also encompasses the idea of using biologicol systems to capture the solne energy in o stored form (reference 1).

One of the important things that plants are able to do is to collect diffuse solar radiation and store it for later use. We know that solar energy is ubiquitons and occurs universally to varying extents tbroughout the world. But the problem is capturing it and storing it in a usable

Planta solved this problem via the mechoulsm of photosynthesis when they developed the process about 3,000 million years ago. It seems time that we reexamina how plants do it, try to improve plant efficiences and even my to emulate plant photosynthetic systems.

The unique canability that plant systems have is to harvest light using their chlorophyll-containing mambranes (normally found in chloroplasts—see figure 1) in order to split water into its component parts, oxygen and protons (hydrogen). Normally the plant uses the protons and high-energy electrons produced in the light reactions to reduce (flx) CO2 to the level of carbohydrates (figure 2),

This is a key reaction to life as we know lt, additionally stace the oxygen is o by-product of water splitting. The carbon dloxida is fixed in the form of organic

companies as diverse as carbohydrates, crops produce fuels which are two to Waste materials (organic) are fatty acids and proteins (and many other organic compounds). I do not wish to go ioto the mechanism of photosynthesis but one can consult numerous honks on the subject (reference 2).

The theoretical efficiency of photosynthesis in real light is 33 per cent but crops grown with good agriculture in temperate zones have efficiencies between 0.5 and I per cent (fixed carbon energy compared with total light energy available) and in tropleal areas between 0.5 and 2 per cent. However, over the whale earth the efficiency of uhotosynthesis is only 0.1 per cent. Even with this efficiency the amount of carbon fixed every year into stored energy is ten times the world's use nf energy in 1970.

Of this fixed energy only 0.5 per cent is consumed by our present world population. Thus one can see that vast amounts of energy are available in a fixed form and there is an excess of food ovailable. The problem is that the distribution of it is required in the energy-consuming temperate countries, or in the food-consuming warmer countries where there is an excess population.

The aim of this article is to show that there are distinct possibilities in using photosynthesis in its natural state or possibly even in an artificial state in order to harvest food, fuel and fibre. One of the important things that has happened in the past few years is that people have looked at the process of photosynthesis in a new light in order to see if it cannot be adapted or manipulated into modern requirements in the world.

The simplest concept is probably energy plantations or energy farming, for example, growing specific crops for their energy content. In the past this would have been considered as harvesting would have been considered as narvesting wood and burning it; the ideas now are more as an integrated harvesting of crops for both food and fuel, the fuel component coming from the by-product of crops, for example maize, might be harvested for its corp and the rest of the plant fermented to mathane or alcohol.

Alternatively, serious consideration ls being given especially lo the United States and Australia to selecting or adopting apecific crops for their photosynthetic efficiency, and other attributes, which would make energy farming economical. For example, in Austrolia they have identified five crops—eucalyptus trees, hibiscus ahrubs, Napier graas (a tropical fodder grass), sugarcane, ond enssova (the Weat African root plant)—as most suited to energy farming. The products from these farms would be formented, or pyrollysed (that is heat degradation of 600 degrees) to products like solld char, oil, alcohols and gases.

Studies have shown at present the fer-

four times more expensive than conventional fuels. The problem with these grawth of algae in a mixed cut. comps is that the woudy material has to fermentative bacteria. The able first degraded by an expensive milling harvested for their food and/a: process before it can be fermented by a content—simultaneously water biological system. This may be averenne and waste disposed of in a useful hy recently discovered enzymatic techniques in Swoden which break down the large-scale growth of plans ligno-cellulose cell walls before a further randitions which economically enzymatic fermentation.

In the United States one group has identified fast growing poplar trees which regenerate from stimips as a suitable crop to use for energy farming. In these cases the land which is not suitable for conventional agriculture is used to grow the energy crop. There are many kinds of economic restraints on these systems, the most important of which, hesides milling processes, is the amount of transport which has to be used to get the material to the processing plants.

The economics of energy farming systems have been worked out quite in some detail and the concept of using blomass is now receiving very scrious attention, especially in the United States. In Europe there is an EEC-sponsored programme which is looking nt the possibility of growing energy crops in Ircland on peat bogs—here the growing of such crops is especially favourable since the area would provide renewable energy resources rather than the once-and-for-nil hacvesting of peat. Other programmes are being looked at in France, Denmark, Germany and the United Kingdom for the use of waste material, such as straw, for the provision of fuel or for its use as food by cattle.

One of the usual questions usked is the availability of land areas. We obviously do not want to utilize valuable agricultural land tunless food and energy production are integrated), but we do want to use marginol land and forest arens which up until now have not been utilized to their full extent; for instance, in the United Kingdom only 29 per cent of the land is used for arable farming. In Scotland vast areas could be afforested rather than left to heother which itself is a result of over-grazing of the Highlands which used to be very densely forested.

I have dealt in some detail with one ospect of photobiological energy cunversion and will now mention others which are heing actively investigated around the world to see if they have both short and long term practical applications.

The extraction of leaf protein from sultable crops can yield turn to three tonnes of protein per hectare per annum to provide human or animal food. About 10<sup>11</sup> tonnes of cellulose are produced hy plants each year making it probably the most abundant organic material on earth.

menting of cassava (which contains 80 of glucose molecules it is considered of per cent starch) to alcohol, is compatitive with industrial alcohol. The four other of alcohols, other chemicals and fibres. Since cellulose consists of long choins

chergy and allum optimum gra marked contrast to presently use linuses.

Physiological adaptation of pla future possibility in light of a recognized metabolic characters plants. C4 photosynthesis has bea to he a characteristic of certie such as maize and sugar case; type of alutosynthesis the first compound formed has four instead of three, as in wheat and C4 photosypthesis has distinct at. n that these plants can use s wie of light intensities, have lower requirements, and can use low, tratinus of COs (often a limiting in the anuosphere).

A further most important charge s that they lack photorespired process wherehy up to 50 per cea photosynthetically fixed CO2 is no to the atmosphere in a light-acity action. Mucht basic and applied to is now going on to see if it is to inhibit photorespiration and plant yields. CO2 enrichment armosphere increases plant yields hibition when the control of hibiting photorespiration and also creasing No fixation.

The crecutly recugnized physic No fixation has shown that the em photosynthetic material passing is leaves to the rnots is the limiting in the process and not the activity Nz-fixing hacteria in the roots. I covery of associative symbiotic tinn in roots of maize, wheat and a also opened up many new fune bilities of climinating nitrogen to requirements in crops. The manipulation of N2-lixing bedst plants also has an exciting future.

Artificial photosynthetic system mimic natural photosynthesis he which is now being looked at hearway. Again this type of resent stimulated by the realization the warld will run nut of liquid ands fuels in the beginning of the nexts and that photosypthetic process provide a means of artificially by plant systems.

Work is being done on the prot of Its gas from the splitting al using chlorophyll membranes of with hydrogenase enzymes from (Figure 3), generation of cleaning photoelectrichemical reaction chlorophyll layers, or purple mest from Halohimm—a sali-llying be-with very stable membranes.

These purple menibranes may at sibly he used for desalination sime exchange H \* (generated in the light No + and K +. It may be possible to CO2 fixation in a chemical mimic CO2 fixation in a chemical come the -the plant enzyme performs the very well, so chemists are now !.

do it in the test tube.

In conclusion, the process dissynthesis might in the future with much more food, fuel and its has been thought proviously. Place very edaptable organisms which the energy crisis 3,000-million is when the blue-green algae learn ture light and split water. It sees that we studied these phenomenation with much greater determinations to either improve the efficiency or actually to emulate plants in genetic manipulation of plans in he able to improve the efficient photosynthesis and thus utilize the cultural systems to produce the corbon and energy requirement future (references 3 and 4). The author is professor of biological department of plant sciences, Kiro lege London.

References

(1) Solar Energy: a UK and (1976) UK Section of Intersection Solar Energy Society, 21 Alboratory, 21 Alboratory

(2) Hall, D. O. and Rao, K. K. Photosynthesis, 2nd edg. Arnold, f.ondon.

(3) Calvin, M. (1974 Science 18) 381; also (1976) Photocheminis

(4) Hall, D. O. (1976) FEBS LAND

Wrong ways to choose right medics

by C. A. Clarke

Doctors who actually treat patients know that diagnoses are not infrequently wrong and that, even when right and the outcome of an illness favourable, there may well have been uncertainties on the way. In other words, we are used to being

in difficulties and it comes as no surprise that answers to questions about training the right number and the right type " of doctor may be erroneous—simply because, as with a difficult bedside problem, so many factors ore unknown. The solutions are in parallel, we ubtain other advice (particularly from clinicians), we edge Into the future with o tentative plan that can he modified at very short notice, and if it is a community dilemmo we can corry out pilot studies. And at all custs we must not fuss.

Academic attainments, in practice the results of three A levels, are probably the best criteria for admission to medicul achools (though there should be no hesitation about making some exceptions) and at present there is oo lack of applicants.

The trend of the young remains anti-pure-science (though there are signs that this is altering) and furthermore, school-teachers, via their GPs and the media, now realize that medicine is an exciting subject and see it as a career for their bost students. Headmasters' reports
and where possible interviows remain
most valuoble odjuncts to assessment.
Is any particular social or family background desirable? Probably not. Variety

is to ba desired, and given the wish to qualify as o doctor, and the necessory A levels, anyone can make a go of it. More specifically, should doctora' offspring ba encouraged to follow in father's footsteps? Certainly It helps a student if a parent knows the ropes-but does it help the patients?

To my miod, because fleshpots are in the ascendant, I would plump for the por-son's child—public-spirited, well-disciplined ond accustomed to relative poverty.

Generalizations, however, are dangerous, and statements such as "the sociol composition of medical students biases them against working in under-doctored areas "simply do not square with the view that the young are more sensitive to the needs of their fallow-men, more aware of the major imperfections of society and more concerned to toke responsibility for the wider social obligations of medicine thun they were a generation ago. Nor does this in its turn tally with the

abservation that juniors are now principally concerned with financial gains and, to enforce their demands, are capable of unthinkable things like working to contract and endorsing the policies of

So, for tha "right type", quot homines, fot sententiae, but overall, whao one comes to consider an individual, suitability is not hard to assess.

"How many?" is far more difficult, but with the uncartainties (as opposed to the unknowables) we can assess odds. Thus it acems likely that the country will remain in economic disarray for some years, that the shortage specialties, such less than for our consultants. It should as gerlatrics, will remoin so, and that more doctors will want to live in the south-east corner of the country than in to Europa, interchange would be frethe industrial north. If these are correct, quent. Compensations for not being called we should not bank on much NHS growth, a consultant could be increased mobility we must endeavour to make do with what we have got and if social justice is to be done there must be some redistribution with a limited term in any given area, little or no administration and plenty of of our resourcea. Uncertainties can be tackled gradually, but unknowables may require sudden changes of direction.

"But what about my mortgage and the education of my children?" Well, bank

Thus, first it is government policy to increase the output from British medical

Whotever the outcome with the foreign posed by the Court Committee. doctors, where are the careers for our . If overseas doctors continued to come



additional young people in a health service where cunsultant and GP expansion is limited by lack of money? Most of them, we hope, will want to remain here, and we certainly want to keep them. they are at present and there could be But will there be jobs? We must not pramotion from the specialist ranks. A But will there he jobs? We must not run into a achooltcacher situation.

Second, it is DIISS policy to encouraga women tu cantinue in medicine, and to enable them to do this after marriage no part of postgraduate medical education need be full time. But how many of the thousand or more women who qualify each year will wont to fall in with this.
Third, and most important, now that

there is free movement in the EEC countries how much migration of doctors will thera be? Theoretically, it aounds like a godsend for the possible unemployed, but atrangely, other countries have similar problems.

Finland, Donmork and Sweden are all over-producing English-speaking doctors and they might come here. It is said that the Germons are hoping that British immigrunts will fill the gops when their ovarsaas doctors leava. Truly, European madlelne is something of a madhouse, and we must be vigilant, not year by year, but month by month.

Surcly a solution to our NHS problems should be child's play to a nation which hos won two major wars within my life. time? The key to the unknowable trends (enreer poats, women doctors and the EEC) lies in hoving a sensitive regulator and this is the number admitted to niedical schools.

Tha planned increase is from 3.276 in 1973 to 3,945 in 1980. Since there are 26 medical schools a roduction of only o few per annum for each of them would reduce the "bulge" later on, and hard-ahip could be minimized if promises to applicants were kept and the reduction only made in the subsequent year. But the regulatory mechanism must keep abreast of altering actuotions and these are far too orgent to await the report of the Rnyal Commission.

To cope with the possible bulga, should copy Europe, where there is a "specialist" career grada which is not the equivalent of our consultant (mony of them ore not on the staff of a hospital) and yet regulres training and the

discipline.

If ive had "specialists" hore, they would stoff the hospitols and their traliting ivould be that required for the EEC, which in general is for one or twe years also entail laarning another language thoroughly, for the grada boing

education of my children?" Well, bank manogers, diplomots, those in the armed forces and university lecturers move increase the output from British medical schools so that we are no longer dependant on overseas decrea. This source of manpower would in any cose probably have dried up, partly because foreign governments look at their graduates in the way we do our nwn, and partly because of the high failure rate in the examination (TRAB) to test lauguege and compatence. Whetever the outcome with the foreign

for this has not been very effective in practice, but the Health Education Countil has great potential, particularly among the better educated sections of the prop

Agreed, most people in all classes as well and adopt the "it won't happen to me" attitude, and in this of comese they are generally correct. Nevertheless there is considerable interest in preventive measures; puliomyelitis was eliminated vaccination and the public collaborated here, and more recently the hazards of obesity have been realized, and the prevention of coronary heart disease by simple measures has had an impact.

Doctor's energies might be better deployed if there was greater use of aucillary wurkers, particularly in hospitals, where, because of the complexities of niedicine, many more junior staff sre needed per consultant than a generation ago. Everyone knows that experienced nurses can greatly increase the efficiency of a casualty or any other nutpatient de-partment, and in intensive therapy units hey can do many of the technical procedurcs. More still could be done provided that there are attractive career posts in the clinical field.

Chemists and health visitors could easily he trained to increase their responsibility for dealing with minor conditio und it would not be difficult tu teach the auxiliury worker huw to rocogniza symptoms that need assessing by a qualified doctor. This opproach, however, requires o greet deel of tact and goodwill on the ant grade, but there are careers below the headmuster, and the specialist system wauld be particularly useful for part-time doctors, male or female.

Ogreof the Government, because the medical profession already feels that its responsibilities are hang croded, and it should be the clinicians who should have the soy about which of their duties can be delegated.
It will be clear from what has been

scheme in one region for one or two spec-lalities. The salary should be between written that no one knows the answers to that of a senior registrar and a consultont, aur problems and therefore it is easential and I would favour speciolists being elig-that we are alert to the possibility of rapid change of direction if the evidence suggesta that this is necessary. Moreover, If "apecialists" were a solution to the bulge problem, what could be done to increase the efficiency of both constultant ients should be fully cansulted about new policies.

bers is minimized, bearing in mind that the economic climate is likely to remain Sir Cyril Clorke is President of the Royal College of Physicians and presided over a symposium on medical aspects of spare-Health education might help here by trying to balve the number of patients rather than doubling the doctors. So part surgery at the 1976 number meeting of the British Association.

bleck for much growth?

they could be supernumerary and trained

for a year or so under the specialists

before they went home. The cunsultants

would continue in the same numbers na

howl of rage olways gues up at the aug-

If the bulge comes about, the new grade

would be worth a trial, perbapa by a pilot

ble at least far the lower ranges of dis-

tinction awords.

If "apecialists" were a solution to the

and GP so that on increase in their num-

gestion of moking any sort of sub-consult-

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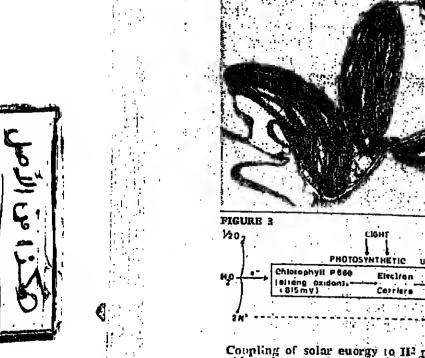
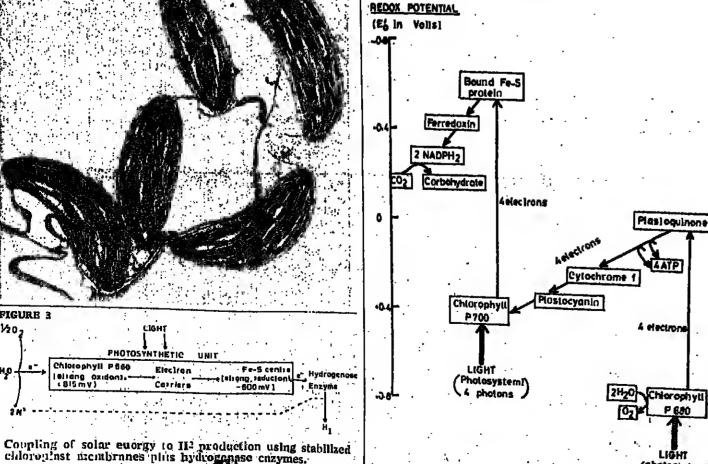


FIGURE 1



## Need to make up for lost time

by H. H. Lamb

Not long ago, h was generally taken for grouted that climute—as distinct from the day-by-day changes of weather and the obvious differences of one year from the next—was essentially constant. Accordingly tables of climatic statistics of the wenther observations of any run of 20 or 30 years should constitute a sound basis for planning decisions in agriculture and for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute a sound basis for planning decisions in agriculture and should constitute and should constitu and water supply and so on, provided only that the instruments were maintained to the highest standards and exposed in a standard manner.

Now, however, attitudes to climate and cilmatology, to what con properly be expected of this branch of science and how it should proceed, are changing. A remarkable sequence of extremes of one kind and another has occurred since 1960.

To consider the British Isles alone these include: in 1962-63 the coldest winter since 1740; in 1963-64 the driest winter since 1743; in 1968 and 1969 on at least since 1743; in 1968 and 1969 on at least four occosions 24 to 48-hour rainfalls in the lowland diatricts which exceeded the ence in 50 years expectation; in 1974.75 the mildest wintar in England since 1834; the great gale of January 2, 1976, perhaps tha severest since 1703; and for 16 months to August 1976, a drought surpassing anything reported in the availabla raingouge records since 1727, as well as in the summer of 1976 a 24-day period warmer by about 4°C than any calendar month in the 300-year temparature record month in the 300-year temperature record for central England.1

Computable extremes have been reported from other parts of the world, the most scribus being the droughts in the Soliel-Ethlopia and that which produced horvost failurea in India and the USSR. The impact of these extremes on harvest yields and trade and the insurance and other judistries and ultimately on governments, has produced an lucreosing most sérious being the droughts in the Soliel-Ethlopia and that which produced horvost failurea in India and the USSR. The impact of these extremes on larvest yields and trade, and the insurance and 1830 had a high incidence of other industries ond ultimately on governments, has produced an increosing demand for advice on the future devalop.

The simplest interpretation of such demand for advice on the future devalop.

The impact of these extremes on larvest yields and trade, and the insurance and the unsurance and the unsurance and the unsurance and the unsurance and the insurance and the unsurance and the insurance and the insurance and the unsurance and the insurance and the insurance and the unsurance and the insurance and the unsurance and the insurance and the insurance

ment of climate for which the science was FIGURE 1

Over uhant the same perind, the aspect of meteorology and the potential of clim-atology have been transformed by the camputer revolution. Yet it is important to arrive at a realistic ossessment of just how the capacity of the science has been changed, as well as how far the development can reasonably he expected to go. No less needed is a careful assessment of what those whose plonning is vulncrable to climate could, or should, do in response to such guidance on future climate as any hecome available.

The most obvious need is for grenter knowledge of the behaviour of climote, of what has happened, and what can happen, on every time-scale from the yearto-year (and shorter) variations to the long-term processes of climate, which also

their characteristic time-scoles observed during many instances of each evolution, is needed. And the picture is now further is acceded. And the picture is now further complicated by the increasing scale and possible impacts of man's activities. (So far, the only convincingly demonstrated effects are the worming of cities and industrial areas and the tendency of the increasing carbon dioxide in the atmosphere to warm the Earth or to moderote any tendency towards cooling.)

alout two to 20 km above the Earth's surface.

It is set in motion by the expansion of the air columns, which lifts all the inper layers over the warmest zones of the Earth, and the deviation of the resulting poleward thrust of these layere as the Earth rotates beneath.

The strongest flow being generated by

meteorological instrument observations meteorological instrument of Europe and east term of the eight-eeuth century about the Increased Incidance of extremas of weather avident at that time. that time:

Figure 1 shows the numbers of abnormally hot summer and cold winter months



simply of all in the patterns and strength of the circumpolar vortex of upper westerly winds over either hemisphere. This is the main fluw of the atmosphere, prevailing through a teen layer from prevail and maintain the desert region.

any tendency towards cooling.)

It is hardly surprising that during the long period when climate was assumed to be constant litric research was devoted to surveying the actual long-term record of climate behaviour. There is now much need to make up for lost time.

The assumption of constancy seems to have been a premature conclusion from the first available 100-year records of meteorological instrument observations

Tha strongest flow, being generated by the temperature gradient, is over middle lottindes, vorying seasonally in atrength or equatorward. Superimposed on this seasonal variation are some geographical anomalies, produced by land, sea and ice, as well as shorter and longer-term variations. Understanding the implied clanages in the energy-feed is vital to the development of any canacity for forecasting mure ment of any calacity for forecasting mure than a few daya ahend.

We find that from perinds of weeks to many years the flow of the upper winds is

sometimes predominantly westerly (the characteristic flow-line marked W in Figure 2)—described as a well-developed "zonal" circulation—and nt other times displays large omplitude meanders, with

prevailing through a theen layer from about two to 20 km above the Earth's surface.

It is set in motion by the expansion of the advancing enst over middle latitudes advancing enst over middle lat

The stationary putierns in periodic Asia with dire effects on the world's food The stationary putterns in periods Asia with dire effects on the world's food blocking maintain prolonged warmts reserves in recent years. There was a fine at different points in middle to the 1940s and o decline since, which the surface over which the winds block in the surface over which the surface over which the surface over which the surface over which the su

the increased temperature and rainfall. In ville the energy fur occasional seem of greater magnitude. Surveys (from starrms.

It is known that the year-toya meteorological satellite observations) of the total extent of ice and snow over the total extent of ice and snow over the northern hemisphere at frequent Intervals tomperatures in Europe (occasived total extent this has increased since the their standard deviations) is from 301 1960s; and other, more fragmentary, 100 per cent greater in periods of 191 1—G. Munley, 1974, "Central England blincking is fraquent than in periods t temperatures: monthly means 1659 to more frequent westerly winds. Evides 1973". Quarterly Journal of the Royal from the fussil records presented by the Metaorological Society, vol. 100, pp. 389-yearly growth river in terms since to 405.

FIGURE 2

tropical and polar zones may also be which have also affected the Indian monevidence suggests that the minimum of enced by various kinds of nuclei for condensation the Arctic sea ice was as early as the various kinds of nuclei for condensation 1940s. The cooling of at least the of the water vapour in the atmosphere. northern hemisphere, and especially the Arctic, since 1950 hna been accompanied by a marked decline of the westerlies (increase of hlocking) over middle

COOL WARM

COOL WARM

These interpretations are a long step

forward from the stute of knowledge and

Areas with warm (shaded) and coul summer in 1976 and in

bold black outline where the average was over 3°C above or

It may be that there is o correlation between periods of global cooling and increase of blocking, which would also mean that such periods should be expected to produce short-term extremes of the past record of climate (and wind aud ocean circulation characteristics) over as warmth as well as cold. The English 1em much of the world and in as much detall perature record shows that there were us observational evidence and "fossil" some impressive leat waves (the summers of 1665 and 1666 which "produced" the Grent Plugue and Fire of Landoo) at the helght of the cold-climate sent day, should elucidate the effects of period of recent centuries known as the Little Ica Age. The geography of obnor-mal warmth and cold in the anmner of 1976 (Figure 3) may also support the

1976 (Figure 3) may also support the same interpretation.

The variations of rainfall seem explicable in terms of variations of wind transport of onisture from the oceans and of support of constructions of wind transport of constructions and telectonnexions where we will be reconstructed and telectonnexions and telectonnexions where we will be reconstructed and the rec cyclonic or anticyclonic development over

be a equipped to pursue the second and third (a) items and seem generally to b, concentrating on them. The first irea poses the abst broadly interdisciplinar problem in all science: for contribution. to reconstructing the past record of climate come from fields as diverse as studies of classical antiquity and ancient scripts, measurement of stable and no-stable ismones and hiological species counts in the sheleral remains of micru-

famua on the orean hed.

Such work is best done in a university
environment and in bodies such os the
elimatic research unit at Norwich, Similarly, the third (b) item is covered by a variety of geophysical and astrophysical institutes in universities and elsewhere.

the termination of the second

phical ranges and timing of the result The leading official meteorological services with their giant computers are

No unc of these lines is likely to give odequate results on its own, ludged any such pretensions, from whatever quarter they come, can only be deplored. It is important that arrangements such as conferences and projects for joint research should continually be made to ensure the necessary intercommunication between these very different fields of study and

the people engaged in them.
It happens that research under the second and third (a) headings, with by far the greatest casts, is so far the only side endowed with official funding. This may be understandable in relucion to the sup-posed threat of a drustic global climatic change within the next 50 to 100 years resulting from the increasing scale of man's energy production and its by-products, the subject of a solemn warning issued by the World Meterological Organ-ization in June 1976.

practice only twenty years ago but they tall far short of constricting a forecasting system. Research towards this end is plainly urgent and needs to be pursued But it fosters the illusions that signifieant climatic changes are only liable to be produced by man's activities and that theoretical modelling of the processes of climatic fluctuations and changes can use-fully be pursued without knowledge of

the past behaviour of climate.

Knowledge of the past record of climate is needed to test the theoretical models' ability to explain it, and to identify processes which cause cyclical recurrences of specific elimate tendencica at intervals ranging from decades to conturies and mi

sent day, should elucidate the effects of every kind of change in the externol con-ditions upon the atmosphere and occans and the feedbacks and teleconnexions It is only from allequate knowledge and assessment of the regulority of the latter that it will be possible to estimate the probabilities and margins of error that should be attached to any forecast of

cyclonic or anticyclonic development over fluence the Earth's atmosphere and the rogions of interest. It is uncertain how climate, ns well as physical linkagas be unit, University of East Auglio, Norwich, far the precipitation may also be influenced the Earth's atmosphere and the nuit, University of East Auglio, Norwich, far the precipitation may also be influenced the Earth's atmosphere and the nuit, University of East Auglio, Norwich, far the precipitation may also be influenced the Earth's atmosphere and the nuit, University of East Auglio, Norwich, far the precipitation may also be influenced the Earth's atmosphere and the nuit, University of East Auglio, Norwich, far the precipitation may also be influenced the control of the fluence the Earth's atmosphere and

## **Immediate** forecast: uncertain

by B. J. Mason

Weather and climate play such a vital role in human life and affairs that the possibility of any marked change, whother natural or man-made, is bound to course concern While we may discount whother natural or man-made, is bound to causa concern. While we may discount the sensational and irresponsible warnings of imminent climatic catastropha, whather by the rapid onsot of a new ico oge or a major warming, it is important to realize that climatic fluctuations, which occur on all time scales the sensational and irresponsible warthings of imminent climatic catastropha, whather by the rapid onset of a new important to realize that climatic fluctuations, which occur on all time scales ranging from years to millentia, are social impact in the future than in the future in the centers of the major than the colling that the col social impact in the future than in the

increased tha pressure on natural they do not occur at regular predictable intervals. The droughts from 1970 to balanca between the supply and demand 1974 (the rainfall has since recovered) have been attributed to declarate in the

the record. Instrumental records go back Our recent severa drought also came for only about 300 years; one of the most at the and of a five-year dry spell in which for Central England daring back to 1668.

(groph). This and similar racords are so dominated by Fregular fluctuations and abrupt revarsals, with few, if any, regular features, that they bold little promise of predicting future avents by the axirapolation of existing trends.

The most prominent feature of the groph, present also in the record of annual

groph, present also in the record of annual mean temperatures for the whole northarn hemisphere, is that upward trend of temperature beginning about 1880 and continuing until 1940. This trend was reversed between 1940 and 1970 with mean temperaturas drifting sbout halfway back to the 1880 levels.

Apart from the dubiety of making a forecast from such a highly fluctuating period trend, especially when wa do not understand the causes of such changes, there is now avidence that the cooling trend has been arrested. Since 1970 the lower atmosphera in the Artic basin bas were the northern hemisphere, warmed by about 0.2 degrees C and there has been a marked reduction in land, and caused the centres of the major location to lia between Iceland and Scotland, and caused the centres of the major depressions to move well north of the British Isles. This was also accompanied by a marked reduction in land. Although these anomalios had dramatic consequences for the British Isles, they were quite small when viewed on a global scale and were probably the could only 760mm, the low-temperiod May 1975 August 1976 the rainfall totalled only 760mm, the low-temperiod May 1975 August 1976 the rainfall totalled only 760mm, the low-temperiod May 1975 August 1976 the rainfall totalled only 760mm, the low-totalled only 760mm in the rainfall totalled only 760mm, the low-totalled only

Recant disasters such as the drought in tha Sahel ragion of Africa, far from being tapprecedented, bave parallels in the past, Increasing world population and a Although wet and dry spells tand desire to raise living standards have to occur in anomalous groups of years, resources of food, water and anergy, tho balanca between the supply and demand for which could be seriously affected by only rather marginal changes in climato. Essential for understanding and evaluating these changes is a cohorent and consistent reconstruction of the Earth's climatic history, but despite the recent advances in paleoclimatic dating techniques there are still many gaps in the record. Instrumental records go back

rather minor fluctuations or readjust the oceans. Since the most pose mants in the large scala atmospharic circu- computers capable of executing lation which causad compensating changes alsewhere. Naither the European nor the Sabel drought, both of which have eince been followed by besty rains, suggest major and nermanent changes in the Office are much signified represent. major and permanent changes in tha global pattern of ellmate but are expressions of its variability. Unfortunately there has no physical basis for predicting either the timing or magnitude of such floaters. the timing or magnitude of such fluctua-

The main barrier to complete description, understanding and prediction of weather and climate lies in the inimense complexity of the atmosphere in which terns, and seasonal changes such as the complexity of the atmosphere in which terns, and seasonal changes such as the complexity of the atmosphere in which terns, and seasonal changes such as the complexity of the complexity of the present climate the complexity of the c

acting on different space and time scale makes it almost impossible to distinguish cause from effect and unsafa to infe direct causal relationships even between opportunity closely connected evants. The together with the cumulative influence of random disturbances too small between the control of the cont obscrved, sets ultimata limits to 18.
occuracy with which atmospheric ever may be predicted.

momeotum with the Earth's surface

of starting from a motionless, constant temperature atmosphere contslains the major features of the present climin complexity of the atmosphere in which the average annual rainfall over England the average annual rainfall over England was only 826inm, compared was only 826inm, compared was only 826inm, compared to the atmosphere in which rainfall over England the average annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result is a complex annual rainfall over England the result of the climate during this century. The factor of the climate during this century are able to give some for the climate during this century. The factor of the climate during this century are able to give some for the climate during this century. The factor of the climate during this century and the rainfall over England the rainfall ov

at the Earth's surface. The fact that the sun's output does not appear to chaoge by as much as I per cent probably accounts for the failure to find strong correlations between the weather and the sunspot cycle.

Howaver, on much longer time scalas, tha intensity of the solar radiation luci-dent on the top of the ntmosphere varied due to secular changes in the Enril's orbit with periodicities of about 96,000, 40,000 and 20,000 years. These fluctua-tions are much larger than any observed variations in the solar output. Tan thousand years ago, the incoming solar radiation was about 1 per ceut greater at 65 latitude than at present and 25,000 years lated than at present and 25,000 years ago it was 2 per cant less than at present. the cold winter of 1962-63.

for example, at 10,000 bp (before present) in the atmosphere has increased by 10 the radiation received in the summer half

the ice and the corresponding temperature changes of severol degrees Cendgrade in the polor and middle

high pressure centred just cast of Green-laud. The moulified circulation resulted

The seasonal effects are even greater: The concentration of carbon dioxido

certaioly caused by n large volcanic explosion in Bull and nuw, with messuromenta almost back 10 pre-1963 values, there is little avidence that the dust con-

local heoting of up to 10°C due to absorption of the radiation by the dust, but there ware no discernible effects at ground level. This bardly supports the theais that conler epochs in the historical record may have been caused by volcanic cruptions.

the likely effocts of reducing the concentratian of the atratospheric ozona layor by 50 per cent. This produced a cooling of up to 20°C at 40km altitude over tha ropics but again insignificant changes in the lower atmosphere. Since we culculate that sevaral hundred Concordas each fiving five hours per day would not reduce the ozone by more than 0.5 per cent (US scientists have ostimated about 1 per cent), and such a small reduction could effect on the climate during this century. The author is director governt of the

with the long-term and the lon current ruta their stratosphoric concentration would reach a steady valua at about 10 times the preacht level by the year 2100 and reduce the ozona by about 8 per cent.

Changes in an surface temperature independent in the independent in the coldest in Britolic for 250 years, a large area of the consistent this anomaly was inserted into the model it produced an area of low surface pressure centred in the Bay of Biscay and a large area of the surface pressure centred in the lattice with the large area of the consistent with the large area of low surface pressure centred in the lattice with the large area of low surface pressure centred in the lattice with the large area of low surface pressure centred in the lattice with the large area of low surface pressure centred in the lattice with the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of low surface pressure centred in the large area of la medical effects of an accompanying increase in ultra-violet radiation, wa can he fairly conflient that the affects, on the climate will be negligible sud undatect-

However, in general, the rasults of The same model was used to investigate inodel computations should be regarded he likely effects of reducing the concentration of the atratospheric ozona layor because the models still have important deficiancies; in junticular thay do not properly treat luteractions between the atmosphora and the oceans which, I suspect, hold vital cluos to the understanding of cilmatic clunges.

Reliable predictions of such changes will require not only improved models but much grenter scientific effort and comnuter resources for their testing and evolnation and may not be possible for several



#### RITISH ASSOCIATION

## Floating to SUCCESS on glass

#### by Alastair Pilkington

It is 20 years since the world's first production scale float glass plant was started up by Pilkington in St Helens. For its first 14 months it mode no salcoble glass, the monthly operating bill was £100,000 profits. at a time when the company's profits were declining, and there was simultaneously a continuing struggle to secure patent rights in the United States. In 1957 the development team had to face objectively the prospect of failure after five years' intensive work.

Today there are 55 plants around the nvorld using the Pilkington process for forming high quality glass by floating it me o bath of molten tim. These float plants represent on investment of well over £1,000m at today's money values and have a combined annual capacity of nine million topics of glass, most of which is supplied to transport and build-ing Industries. Licensing income from these plants is currently running at £25m

There are several lessons to be drawn from this change in fortune, not least that a development man must remain an optimist I Clear, too, is the fact that hig projects luvolve big risks and big expenditura without any guarantee of success; and that the risks should he taken only if there is a high prohability that success will hring large rewards, both to recoup development costs and to fuod exploitation of tha iunovation—and indeed of futther incovation.

That in turn calls for success to be clearly defined at the beginning of a

In the case of float, success would be not the case of floar, success would be not simply to produce glass by floating it on a bath of molten metal. That was accomplished quickly enough. We would in foct be successful only if we replaced the existing polished plata glass process which was established world-wide as the sole method of making high quality flat

Polishad plate glass was used for car windscreens, mirrors and windows, where its distortion-free churacteristic was becessary. It was mode by a process whose basic principles had remained unaltered for more than 250 years. Essentially, glass was melted, a ribboo was cast and rolled flat, and its surfaces, markad by contact with the forming rollers, were ground and polished to make a high quality distortioo-frae tronspareat product.

Much development work, concentrated largely between the 1920s and 1950s, had led to a highly mechanized and successful process which Pilkington liceosed to most of the world's major flat glass producers. In its ultimate form, e continuous ribbon of glass was rolled from the melting tank

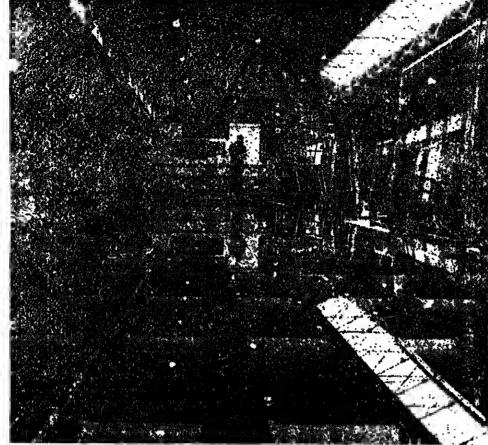
of glass was rolled from the melting tank and passed through an annealing lehr.

The ribbon, still in continuous form, was then ground on both surfaces at the some tima with anormous grindlog wheels fad with progressively finer aand. This machine, celled the twin grinder, wos drivau by 1.5 Mw and this power was expended in grinding e slender ribbon of brittle moterial. Even more remarkable was the fact that the hottom grinding wheels were kept perfectly flat and level while they were waaring away.

While making a first-rate product, however, it had the drowbacks of very high cepital and operatiog costs together with glass wastage of 20 per ceot from the grinding process. Success with float would be to make as good o product as plete and to eliminate grinding and polishing.

Today float has virtually supersaded the polished plote process throughout the world end, as was hoped at the beginning of development work in 1952, is taking over a cousiderable amount of the market previously supplied by the sheet glass process—the flat glass process that has traditionally met most of the demand for thesper domastic and the demand for cheaper domestic and horticultural glass.

Floot glass has thus not only matched tha high quality of plate but also the relatively low price of sheet—and with the bonus of better quality. Float, in fact, now supplies about 10 per con-



continuous ribboo of float glasa leaves the annoaliag lehr having beeo cooled down in controlled stages ou its woy to the automatic warehouse.

Right-diagram of the float glass

the Western world's clear flat glass

In the process e coatinuous ribboa of gloss moves out of a melting furnace—typically holding 1,700 tonnes of glass and processing 3,000 tonnes a week—and floats along the surface of on eoclosed both of molteo tin. The ribbon is hold in a homeoly surface of the is held in a chamically controlled atmosphere at a high enough temperature for a long enough time for the irregularities to melt out and for the surfaces to becomo Ilat and parallel.

Because the surface of the molten tin is dead flat, the glass also becomes flat.
The ribbon is then cooled down while
still advancing across the molten the still advancing across the molteo the until the surfaces are hard eaough for it to be taken out of the bath without the rollers marking the bottom aurfoca; so a ribbon is produced with uniform thickness and bright fire polished surfaces without any need for mindings. faces without any need for grinding and pollshing.

The most important developments in the process sinca the 1960s have been the process sinca the 1960s have been in making it continuous, from raw material ioput to automatic offloading of the finished product already cut to size; and in greatly iocreasing the loads melted. There have been important axtensions to the thickness range and other innovations leading to the production of completely new glass products. products.

Vary faw industrial processes of the complexity of float cae boast o similar degree of continuity. Its continuity is, in the view of Pikiagton and the world's mejor glassmakers, one of its major advances. Polished plate, itsalf locorporating considerable steps towards com-plete continuity, still hed an intermittent polishing process and most cutting was

manual.

Today's float lines, on the other hand, bave the four major atsges of melting, forming, cooling and cutting co-line. Achieving complete continuity was, of course, alded by the fact that a continuous finished ribbon (needing no grinding ond polishing) was presented by the float bath and this has anabled ramarkable developments to be made in cutting and handling technology.

The importance of automating this

The importance of automating this atage of the process is demonstrated by the fact that half the costs of the finished product to the customer are incurred after the first cut has been made on the continuous ribbon.

Remarkable too, in contrast with St Helens' first float plant, are the differences in scale of today's plants. In 1957 our plant was capable of melting 1,000 tonnes of glass o weak (qoito enough in view of the fact that it was unsaleable) whereas today's biggast plants can melt ovar 5,000

Commercially, glass from 2.3mm to 25mm thick is now mode on the float process. A range of 1.5mm to 50mm is known to be possible and the process has even microns thick.

The ability to make thin glass—particularly 2.3mm—has been important to tha



tonoes a week as a result of bigger furnaces and biggar float baths.
A result both of the chonge itself from plate to float and of the greater capocity of today's plants has been considerable

Increases in productivity with one man able to produce five times as much glass a week as on the plote process. The increasing price competitiveness of float glass with sheet glass has meant that the industry has been increasingly able to supply float products of the thluncr end of the thicknoss range—previously domi-nated by sheet. About four years ago Pilk-ington switched its 4mm flat glass sup-

plics—the type used as window glass in most homes—from sheet to floot, thereby providing a hetter, distortion free product, and one which was easier to cut, without increasing the price. Increased loads on the float process have also led to the need for higher production, cutting and handling speeds in order to proceas the greater volumes of

glass produced. And as a result of increased speeds too, some rethinking of the technology for controlling glass thickness has been occessary.

A phenomanon of the float process, discovered during the development years, is that of equilibrium thickness; the pro-cess lo fact wanted to make gless of o particular thickness. It was fortunate thet the thickness it "selected" was about 6.5mm as this was the requirement of much of our market at the time.

We had in fact diacovered a classic example of a non-spreading system in which equilibrium is established between grevitetiocal and surfece tensionel forces when the ceotral thickness of a lorge pool or ribboo of molten glass bas reeched a

What this meant practically was, on the billty of a formiog process in which mol-ten glass could be allowed to spread frealy over the surfece of the molten metal, the edges of the glass baiog obsofree of any shearing forces that could distort the glass; and, on the other had, that our ideas of making the finished glass thicker or thinner simply by rolling a thicker or thioner ribbon of

glass on to the betb, were unworkeble.

Methods of controlled stratching to
make the ribbon thinner and of "building up" the ribbon to make the thicker products were deviaed. And now these n turo have been modified as speeds have iocreased.

25mm thick is now mode on the float process. A range of 1.5mm to 50mm is known to be possible and the process has even been used to float a ribbon only 100.

development of new products are for the transport industry. Safetyie has long occupied the minds of that of a new car windscreen c virtually eliminates serious cuts hi necepant's face and injury to the should be strike the windscreen is necillent,

The pruduct, whose first industry application is in the new & 3500, while the advantages of tough glass to thuse of a laminated tone consists of a inw-stressed outer gin 2.3 mm for optimmen stone reiste thermally high-stressed inner glassed mm for low lateration and 8 mm interlayer of polyvinyl butyral

The fact that the glass is thin more yields and then brenks when the strikes it and that ovoids brain and The fact that the inner panel of gla-toughened means that it will break small granules and this greatly set the chances of the face being cut.

Conventional laminated winder are more rigid and more likely to Conventional toughened window using a single panel of toughened a breok into small granules but the may pass straight through on imput

New glass products have also developed "on-line", by-passing the for secondary processes. Two protone o glass for reducing the sail entering a building and, sande decorative patterned glass, but i produced by modifying the cleri ribhon while it is actually passing be the float bath.

Tire secil for this novel develop was a problem encountered in the years of flunt when researchers trying to prevent slannous axide eduthe glass surface. The idea was to the lesson of this problem to admit and to put lons intn the glass deliber and ut high speed.

The hasis of the process is an ekchemical system which drives me lone into glass to a controlled deplifutensity whilst the ribbon is admin The result is closely-packed and extending metal particles about 400 Angula diameter-enncentrated imute below the glass surface where the Impervious to abrasion and the

Unique features of the float glass cass are expluited. First, the glass is horizontal and supported on its electrically conductive medium. Set the surfaces of float are finished high temperature and held at higher perutures for longer periods that

flat gloss processes. Third, the time during which fee float surfuces ore held uver a partitional surfuces or a held uver a partitional surfuces or a held uver a partitional surfuces or a held uver a partition or a ing agent for converting the ions mctailic state. This process was first used to Pit.

a bronze solar control glass and not there has been a further refused called pulsed electrofloat, which are renge of patterns and colours to inside the glass, leaving the surface of the uneven textures of training the patterned glasses.

With the growing capability of the unevent textures of training the patterned glasses.

process has come o continually emplished for the capital cost would have been given and the capital cost would tive and massive retultation wells baen invited—but rather to build in its established manufactuting tories auch as the United K Canado and Anstrolie end offer to other major manufacturers, with the proviso that they the polished plate glass mooufactured.
Incorporated in the licence is

provements clauso which enter licensees to make further advants the process end sllowing them all lmprovements to any other license

supplying them free to Pilkinglod.
The first licence went to PPG.
Uoited States, in 1962. Today the operation and more uoder

gless. The ability to make thin glass—particu-larly 2.3mm—has been important to tha Brothers Limited. BRITISH ASSOCIATION

## Potshots at research puddings

#### by J. C. Polkinghorne

There is great satisfaction in seeing a physical theory nearly fitting the experimental facts. Yet there is an altogether largest to the world, is the super proton different (celing of excitement when it becomes clear that a set of facts is incapable of explanation by existing theories. One is then on the threshold of new know-

The resulting advance may only be modest. It may be that an over simulified model of the system considered has to be made more cluborate in order to attain greater reulism. Often this invulves more labuur than inspiration, though on occasions the insight demanded may be very dcep indeed.

Just occasionally the challenge presented by the new facts is so profound that o revision of the basic principles themsclves is called for. The outstonding exomples of this happening this century are the events which lead to the discovery of special relotivity and of quantum mechanics. Such dramatic discoveries take place in extreme regimes where matter is examined in conditions as far os possible removed from those in which tha established theories hove been tested.

Crudely speaking these or a the domains of the very large and the very smoll. Astronomy is concerned with the very large and elementary particle physics with the very small.

The uncertainty principle implies that short distances require high energy, and for that reason the subject is often called by its alternative name of high energy physics. In its earliest days, it relied on

the free supply of energetic particles provideal by nature in the cosmic rays which strike the earth. However these are availulde to an abundance which permits only crude and simple experiments.

The great advances of the past 25 years have resulted from the production of artificially accelerated particles. These come from machines, synchrotrons and linear accelerators, which are gigamic pieces uf precision engineering. The quest for shurter distances implies higher energies, which in turn require larger and more expensive machines.

The dimensions of the largest of these are now measured in kilometres. The such, which will share with an American synchrotron (SPS) which come into operation at the end of 1976. It is the latest facility to be provided at the European Centre for Nuclear Research (CERN), the international laboratory supported by the countries of western Europe (including the United Kingdom), which for 25 years has played o leading rule in the development of high energy

What sort of experiments the tho machines make possible? Their general noture can be indicated by a somewhat hizarre commdrum, Suppose one wera provided with a Christians nucling (the porticular system under sindy) and o loaded revolver (the synchrotron or source of high energy particles). The question one has to answer, using the peculiar equipment at one's disposal, is "are there any sixpences luside the pudding?" (is there structure within the system of a smaller size than the whole system itself?).

The answer to this weird puzzle would require one taking a few pot shots at the pudding (on elementary-norticle physicist would say "performing a scattering experiment"). If there are no sixpences inside the bullets will always as trackly through but if there are some go straight through, but if there are some sixpences, just occasionally a bullet would strike one and be deflected. The more there are the more often this will happen. In an analogous way the high energy physicist attempts, by measuring the degree of deflection in his scattering experiments, to determine the constituents of matter.

a long littory. It was by just such an approach that Rutherford in 1911 established the existence of the nucleus within the existence of the nucleus within the atom, perhaps the must powerful of quark within matter. The earliest single incentive to the creation of quarter of this kind were found in the tum theory. What has happened over the United States but the recent decision of years has been that the probing of the German government to hulld a big matter has been pushed to shorter and electron machine tPEFRA), will, before shorter distances, revenling successive

layers of structure. One of the most exciting possibilities which could be emerging from the present spate of discoveries in high energy physics is that in an important sense an ultimate level may have been

The contemporary hasic ingredients of markine the distinction of being the matter are the celebrated quarks. The indirect evidence for their playing this role is very strong, much of it deriving from experiments and theoretical analyses in which British physicists have played significant parts, notably the elucidution of resononce structures and the study of certain types of events observed at the CERN Intersecting Storage Rings (ISR), Yet no ono has ever

found a quark by itself, and unt for want of lonking either.

This is very puzzling. Returning to the pudding problem, we should occasionally see sixpences by themselves because our hullets would actually knock them out of the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding This is what he had account to the pudding of the pudding. This is what has happened at every other stoge of the onion neeling (nucleus knocked out of nuclei, and so

on) hut apparently not now. Thus the idea has grown up that maybe the quarks have a new fundamental properly. Everything is mode up of them but they connot ever be knocked out singly and seem up their own. In u word, they are confined. If this is so it will have been given to our generation to find a truly fundamental level in the structure

nr whether it requires a new fundamental law of physica for its realization, needs further study. Needless to say these questions are being pursued with great vigour in scientifically sophisticated countries the world over,

If the answer proves to be yes It will (fortunately for those endowed with intellectual curiosity) not prova to be the end of all fundamental endeavour on

As a technique such investigations have the frontier of the very small. For, at the end of this decade, pur Europe in the forefront of this activity.

High coorgy physics is intellectually

very exciting and never more so than at the present time. It is also very expensive. Our subscription to CERN amounts to more than LISM per annun and several more millions must be spent on preparing experiments in this country in order to extract full value from this. Is it worth it? The question is rather akin to asking if a Rembrandt is worth £101. In each case one is getting something of high intrinsic worth that represents the culminoting of an important aspect of Western culture.

To sny that we ran no longer afford such activity would be to opt for less than mediacrity and to deny a heritage of extremely successful participation to the endeavour of fundamental physics. It would be to make a decision which ran contrary to that of our European neighbours, the less ecunomically successful such as Italy no less than prosperous Germany and France.

There are also psychological gains from fundamental science for related disciplines. This is because the different parts of the scientific world interact upon each other more than is commonly recognized. But arc there also gains for the gross

national product as well as national pride? I cannot as an elementary particle physicist place my hand on my heart and say I recognize inneediate technological consequences flowing from my subject, other than the developments in precision engineering and materials which accelorator construction undoubtedly stimulates.

Yet I am also conscious it was ever thus. Because fundamental science is concerned with extreme regions it always scems remote from the proctical world of its time. However, the lessons of history suggest that in the longer run this is oot so.

Professor Polkinghorne is in the department of applied mathematics of Combridge University.

Correspondence

## Hannes Alfven's view-myth or history?

#### by Andrew Belsey

· I was interested to read Hannes Alfvén'a article, " Cosmology : Myth or Science ? ", which appeared in the first issue of

Nobel physics prize winner should appear increase the arbitrariness of the system and the complexity of the mathematical to be unawere of the very important dehatas that baya traosformed the history could be achieved only by sacrificing of science in the past decade or so. Prosystematicity and simplicity—a price that fessor Alfvén Instead adopts an old- was thought too high to pay, feshioned end discredited positivist historiography, en epproach which unfortunately has a teodency to encourage oversimplification, even to the extent of lative definition on to the historiography gettiog the facts wrong.

Professor Alfvén suggests that epicycles of Copernicus. were introduced into the Ptolemaic system to get it to agrea more closaly with observatioo. But this is nonsansa: thare was no pre-epicyclic Ptolemaic system. There had of course bean other sys- system of Coperulcus. tems of astronomy, and Ptolemy, like tha

irregular planetary motions to a system of uniform circular motion had been solconcentric spheres. Ptolemy's system can be considered as a very much more detailed and sophisticated raworking of Eudoxus's system, using epicycles, eccentrics and equants rather than concentric spheres.

Furthermore Tolemy, with a system of concentric wanted was agreement with observation but also and above all a simple system which preserved uniform circular motion without resorting to the arbitrary devices that Ptolemy relied on, a concentric spheres.

Furthermore Tolemy, with a system of concentric syst

It was this arbitrariness or imperfec-

tion, rather than disagreement with observetion, that led to the downfell of the Ptolemoic system. It is simply not true that the Ptolemoic system was e "rigid structure incupable of incorporating new discoveries". For observational difficul-

of science. This can be shown by the case

Professor Alfyen writes: "Under the

.First, Copernicus was a theoretician

at the preface to Dc Revolutionibus Orbium Coelestium will show. What

A momant's thought will show that Copernicus was quite justified in insisting on these "metaphysical" principles Instead of simply going for observational which Alfvén mentions) nor the eccentric (which he does not) was original to Ptolemy—they were used by Apollonius and Hipparchus respectively—while the third devica introduced by Ptolemy, the equant, was a completely arbitrary way of reducing the observational data to uniform circular motions.

It was this arbitrarioess or imperfectively—whole prizes: it is simply not science. The whole point of scientific research is to produce theories.

Now Professor Aliven suggests that the theory which resulted from the work of Kepler, Galileo end Newton "was on empirical synthesis, e summary of all estronomical observations ever made".
But this cennot possibly be true, for all the astronomical observations ever meda British Association (THES, September 3, description during another epicycla or other innthe during another epicycla or other innthe corrected Keplor's lows, which hed made use of Tycho Brahe's observations, and increase the arbitrariness of the aystem had been, were not eccurate enough.

If onything Newton's Deory was o summery of the observations that should have been made, and this is enough to show that the reletion between observeted than Alfvén ellows, it also shows how necessary to theory-huilding ere thusa principles like systemeticity and simplicity, principles without which even the most occurate observations would be scientifically starile, n foct as well-known at Kepler and Nawton as to Copernicus. impact of more recureta observatious that Ptolemeic system was raplaced by the Copernican system." This is false, if by had not abandoned the belief in a priori "Copernican system" we understand that

Another sarious Inaccuracy in Professor Alfvén's eccount is his confusion between vast majority of great scientists, was and no obsatvar, and the data he used building on the work of his predecessora were no better than Ptolemy's. Sacond, astronomy. All this ostronomical systems (Thera hed also been the Aristotelien although of course Coperulcus was concommonly, which I shall mention in equation of course Coperulcus was concomment.)

The basic problem of reducing the called "the first principle", as a glanca representations of the cosmos. Thus

Alfvén's referenca to tha "Ptolemaic systam with the complicated system of crystel spheres" is a serious bluader.

There were no crystal spheres in tha Ptolemaic system. The spheres wera Aristotla's, but they formed not a complicated but a simple system. Understood realistically, the complicated Ptolemaic system was quite inconsistent with tha Aristotolian cosmology. Hanca it was not undarstood realistically but was seen simply as a conveniont mathematical model parmitting calculations and predictions. This divorce between astronomy and cosmology was another spur to Coper-nicus: he insisted that his systam was botb o mathematical and a physical repre-sentation of the cosmos.

Professor Alfvén's version of the bistory of scionce is simply a myth, which shows that he is indeed right wheo he says that scientific progress in recent centuries does not meen s complate and dafinita victory of common sensa and sciance over myth". All the facts given here in this articla ara avallable to anyone who consults a simpla up-to-data bistory of science. So why has Professor Alfvén failed to notice them? Probably it is because they fit ill with his preconceived notion of science as the merch of common

This notion is comforting, for at leost two reasons. First, it provides a built-in excuse for scientific failure: thus Professor Alfvéo suggests that the luability of cosmologists to produce an acceptable theory is the result of their still thicking In a basicelly mythical way. In fact, though, coamologists need no excuse: they are faced with an exceedingly diffithey are raced with an exceedingly difficult task. Secondly, it has a clear ideological value in providing e stick with which to beat those who are aceptical of the extrevsgant claims made on bahalf of aclence: they too ere stuck in mythicol ways of thought and therefore are irrational. But those who criticize myth in others should bewere of the to appoint. othera should beware of the tu quoque: when professors of physics write on the development of science, myth rather than history tends to prevail.

The outhor lectures in the history and philosophy of sciance at University College, Cardiff.



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The war is a second read to the second of the second of the

#### Annual meeting

The annual meeting of the British Assuciation fer the Advancement of Science has been held since the creation of the association in 1831. The 139th meeting will take place at the University of Aston to Birmingham from August 31 to September 6, 1977, under the presidency of Sir Andrew Huxley, FRS.

This of Itself must be a notable event, net simply because Sir Andrew is a Nobel Prizewlnner, baying been nwarded this distinctien fer his remerkeble rescerches inte the mechanism of nerve impulses, but because he will be the second member of his family te impress his influence on

a BA annual meeting.
In 1860, his grendfather, in expounding the evidence upon which Darwin had based his hypethesis of evolution and the origin ef species ond overturning Bishep Wilberforce, changed the current of thinking, not only in Great Britain, but broughout the educeted werld. It would be a beld man whe weuld assert that teday there are ne longer deeply held heliefs which are embraced rather beceuse we wish they were true than because there is convincing evidence that

At the meeting in Birmingham next September, e city last visited by the asseclation in 1950, more than 300 papers on diverse aspects ef science es well as on engineering, sgriculture, education, socielogy, geegraphy and much else will be presented besides the presidential

These are all designed to take a reflective view of the state of British science and the way it relates to our seciety. Each locture and debate is almed at the layman—or et a scientist specializing in a different fleld—whether he has a specific need for scientific or technelogical infermation in his werk, whether be is interested in the unfolding of sclentifie knowledge or whether he (or, ef ceursa, she) is concerned with the application of science und technology to the economic presperity and well-being of

For those whe can appre the time the ideal arrangement is to sitend the whole week of the meating end thus savour the full sweep ef avants and enjoy tha delights ef rubbing sheulders with a divarsity ef sciantists in full cry. Because this is net always pessible, the progremme has been erganized so that visitors can come fer part of the week or over tha weekend and select which of the lecturea and other evants be ar she wishes te attend.

a highly individual pregramme. Fer example, managers in industry (and Bir. mingham claims to he the industrial heertlend of the kingdom) can select lectures on angineering, or chemistry, or economics which will he ef practical valua to them. Such useful parts of the maeting may be scattered the surphers the realing may be scattored throughout the week. Indaed, these who have planned the meeting have gone further still.

At the Aston meeting, specific sections balleved to be of particular interest to people involved with those areas of industry commonly described es "middle management" here been used and the middle management.

"Cooling with complexity". Attendance et such a two-day symposium will involve

BA Annual Meeting, August 31-Saptember 6,

Please send me further information about the Anoual Meeting of Aston as soon as it becomes available. 

Pr'yramme
Sci :ntiffic and industrial visits Cni eera events

BA ANNUAL MEETING 1977, University of Astou, Freepost\*, Birmingham B4.

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NAME
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and the same stage of the authority of the same stage of the same stage of the same stage of the same stage of

day use of science and the technologies substantial representation of the major derived from it to beaefit from a unique opportunity to broaden their knowledge industry, and understanding.

BRITISH ASSOCIATION CONTROL OF THE PROPERTY OF

The plon to merge the exposition of extended so thet much of the programme people. As a result of genereus suppert from the Foyle Trust, a number of young people will have their attendance finen-cially spensored. Furthermere, in additien te the lectures and scientific visits which censtitute the core of the meeting, there will be a series ef events designed le illustrate the way in which seience is invelved in a werthwhile eareer. The ideas se far discussed include the design and operation of an eil rig, a pecemaker, and the manufacture of man-made food.

There is geod reasen fer the British Assecletien to claim that its aunual meeting remains teday, whet it has always been, the parliement ef science.

#### Report to the nation

It is likely that ot the Asten meeting there will be e majer public announcement of the results of an intensive rasearch project initiated by the British Association and jointly sponsored by government and industry on the topic: "What steps are desirable with respect

to the education (including career advice), recruitment and depleyment of prefessional level engineers, to impreve the perfermance of British manufacturing perted by a BA management committee is supported by a BA management committee with Sir lenan Mindock is chairman with Sir Lenan Mindock is chairman.

The report will be the subject fer the first time of public debete to which all sections of the community and government will centribute. The most senior menagers of industry in Britein will be invited te participate in both the reperting and discussion sessions on the report now being planned te take ploce on the evenings of Thursday and Friday, September 1 mid 2, 1977.

The project, nimed et essisting Beitoin's industrial performance by investigating the contribution made by prefessionallevel engineers te manufocturing industry, is te be undertaken under the auspices ef the British Asseciation with full backing frem the gevernment, indus-try and the scientfic world.

The ebjective of the preject is to recommend action to be tokon in the education, recruitment and depleyment ef engineers te impreve the perfermence ef tha British manufacturing industry, This provides the opportunity to cheose and, in particular, the effectiveness e productien manegement.

The inquiry will be cenducted by a specielly recruited, full-time team hased at the University of Aston in Birmingham. Tha theme has arlsen out of discussions batwean the British Asseciation, the Royal Society and the Netienal Economic Development Offica during which it was emphesized that the angineer plays n leading part in determining the technical competitiveness of manufacturing indus-

It was else stressed that the British

an expenditure of less than £30 including the Schools Council, the TUC, the CHI the cost of publications and accommoda- and a number of individual companies. A British Association conrdinating The planning of the meeting in this way group has been formed to lambeb and is designed to encourage more people in monitor the project; it consists of repreindustry who are involved in the day-to-sentatives of all the above landies and

The project team itself will operate under the direction of the vice-chancellar new discoveries in science with the prac- of Aston University, Dr J. A. Pape, who, tical appliestions of science has been as well as having interest in industry, is also the general treasurer of the British will be of particular interest te yeung Association. The resulting report will be published in July 1977 so that public discussion of the findings can culminate in an infermed debate at the annual meeting.

The membership of the coordinating group is made up of Lerd Baker, Dr T. Emmersen, Sir Amlrew Huxley, Dr J. A. Pope, Or Magnus Pyke and Sir Lincoln Ralphs, representing the BA; Sir Alan Cettrell, Prefesser D. W. Holder and Sir James Menter representing the Reval Seciety; Sir Renald McIntesh and Mr 11. Asher of the National Economic Development Office; Mr G. A. Dummett and Mr M. W. Leonard of the Council of Engineering Institutions; Sir Kenneth Berrill ef the Cabinet Office, Sir Alex Smith of the Schoels Ceuncil, Mr James Hamilten the Department of Education and Science, Sir Peter Carey of the Department of Industry, and Mr Richard O'Brien, chairman of the Manpower Services Cennnissien.

Other members of the group are Sir Alec Cairncress, Lerd Nelsen, Lord Hinton, Mr H. H. Tomlinson, Sir Frederick Dainton, Professor J. H. Harleck and Mr John Methyen, in addition representatives of schools, the rescurch councils and industry have agreed to

together with Dr J. A. Pope, Mr F. Mei-calfe, Mr W. A. Mallinson, Mr J. A. Jenkins, Mr M. Bett, Sir Alan Cottrell, Major General Sir Leonard Atkinson, Prefasser Sir Som Edwerds, Mr R. G. Usher, Mr P. Chappell, Mr F. A. Buker, Mr A. Thempson, Miss A. E. Mueller, Mr H. R. Windle, Mr V. Edkins and Dr Julin Rae. Mr D. Dihsall ef the Department ef Industry acts as secretary.

Finally, there is the project team ltself. This is made up of Dr J. A. Pope es the general directer together with Mr Vincent Edkins, semetime managing directer of Guest Keen Williams Lid., ns senior project officer, Dr Smart Macdonald of the Technelegy Policy Unit at Aston, Mr James Wilson, a graduore atudent of industrial administration, and Richard Swainc, whe has been secended to the preject by 1BM.

#### Branches and BAYS Net everyene raelizes hew much the

British Association does to show young peeple what science is and explein to them the way in which it colours our understanding of the universo end influences the kind of life we live today. Gifted teachers can do much lo excite tha interest of their pupils in science but inevitably the fact that scientific subjects are part of the school ayllabus bas e tendency to deadan the interest of some of less imaginative boys and girls. Also there is a good chence that scientists who are themselves engeged in research and are thus involved in the Association bas always bean particularly agement "heve bean gathered togather within the week's programmo into " packages" extending over only one or twe days.

The papers falling within these " packagea" will be published in advance. They will cover such topica as, for example, agent to the papers for example, agent will be published in advance. They will cover such topica as, for example, agent to the papers of the BA living and the revitalization of the papers of the BA living and the polytechnic, Moulsecoemb, Brighton in various agent to the papers of the BA living and the polytechnic in various agent to the papers of the BA living and the papers of the BA living and papers of the BA living in various agent to the papers of the BA living and papers of the BA living and papers of the BA living in various agent to the papers of the BA living and papers of the BA living and papers of the BA living in various agent to the papers of the BA living in various agent to the papers of the BA living and papers of the BA living in various agent to the papers of the BA living in various agent to the papers of the BA living and papers of the BA living in various agent to the papers of the BA living and papers of the BA living in various agent to the papers of the BA living and papers of the BA living in various agent to the papers of the BA living in various agent to the papers of the BA living in various agent to the papers of the BA living and papers of the BA living in various agent to the papers of the BA living agent to the papers of the BA liv

society and the revitalization of the nation's economy.

Censultations with sanior officials in government departments, including the Central Policy Review Staff, as well as industry, the Council of Enginearing Institutions end other inferested parties, have ensured the widest possible backing from ell quarters.

Extensive informetion relevant to the project is elready hald by government departments, industry, the CBL, joint bodies such as the Enginearing Industry Training Board, and the engineering profession itself. This knowledge will banade available to the project team, to suggestions fer action.

Som this premises that devoted men end working in various parts of the BA living and working in various parts of the BA living and working in various parts of the United the Hemselves into the surious parts of the BA living and working in various parts of the BA living and working in various parts of the BA living and working in various parts of the BA living and working in various parts of the United themselves into the 17 territorial branches organize meetings of the United themselves into the 18 polytechnic, Moulsecoemb, Brighlon and Working in various parts of the United themselves into the 18 polytechnic, Moulsecoemb, Brighlon and Working in various parts of the BA living and Working in various parts of the United themselves into the 17 territorial branches organize meetings of the BA.

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These branches organize meetings of the United the 19 local secures into the 20 local secures into the 19 local secures into the 20 local secures into the 20 local secures into the 20 loca

gether with informed comment and ment both to those who come to speak suggestions for action.

Cooperation has already been conscheme supported by the Royal Society. This is the British Association of Young Manpower Services Commission, the National Economic Development Office.

Distinguished fellows, whose names every the Council of Engineering Institutions, thousehold words in the world of scientification.

fic research, talk to the young per about their work. Who can tell a sparks are kindled among the member, their audiences seeing and hearing t the actual people who make the dista ies are like? And this brings us to 24 cription of BAYS,

BAYS comprises young BA memb usually belonging to a group of selection in a locality. Each one is interested science. They pay their subscripte 3th and, with sume help from the headquarters, band together to fore; branch with their own president, see lary and treasurer,

There are now more than 70 brands with a tutal membership exceeding 1600 Science fairs have over the reproved in he a impular means for one ing young people in active pudicipal in science. They are not a direct pane the programme of BAYS nor do the necessarily originate from a breach of BA itself. At the same time, BA bran members end members of BAYS branch

may be invelved in them. A science fair is erganized by its or locol committee in which a variety people may be invelved. Some may I frem lecal industry, ethers from school and lecal education authorities. Univer ties, pelytechnics und technicol college in a vicinity may also take part and fine cial support ceme from diverse some seme official, some voluntary.

For several years generous provise has been made by The Sunday Time The result is a cooperative effort also ing young people and their schools demenstrate in simple terms by the younger pupils and in surprisingly on plicated and suphisticated ways by the more senior what they are doing i science.

An added attraction for the park phats is to be singled out by the BBCt take part in the television programs Yming Scientist of the Year'

To juin the IIA and take part in brasi nctivities readers should send a chee or £3 in the membership secretary, !! Fortress Hunse, 23 Savile Row, Lond WIA IAII. To find our about the po gramme in their own areas they can wit

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Magnus Pyk

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#### Innenpolitik

**Donerial Germans** edited by James II, Sheehan New Viewaduts, 17,50 ISBN 0-531-05374-1

The new school of German hi farians is much concerned with continuity and discontinuity. They re forcions is much concerned with con-forciny and discontinuity. They re-interpret German history from the unit only a contribution to a precireir ideas.
Their central doctrine is explained

unst clearly in an important essay by Walfgang Montasen which cames chronologically at the end of the book. This doctrine is the primacy of domestic policy; das Prima der Importability Innenpolitik. Professor Monumsen himself contests the validity of the

ler draws its bose line when he writes; "Germony changed between 1870 and 1918 fram on ogrerion 10 a highly industrialized country". He

sary to use foreign political entagonisms for domestic political purposes.

In the short compose of the next essay there is something of much more than particuler eignificance. Due importance is normally given to the government of imperiol Germany by civil servents meking their living out of their profession rather then by purifomentarieus ond politicans. John Röhl can show how politics, turned out by one door, canto in by onother. Incrensingly during the lost decodes of the Empire those at the top of their profession who might expect appointment as ministers were pessed over in fevour of less well-qualified men, the eristocratic hesds of the provincial edministration who knew more obout power and its exercise. Government at the highest level demanded political skills whetever the Bismarckion constitution might the Blamarckion constitution migh

ite Blsmarckion constitution might have erranged.

Hans-Ulrich Wehler's essoy on Bismarck's imperialism, 1862-1890, is the perfect epplication of the doctrine of the primacy of domestic policy. It is the essay by which the views of the school must be judged. Imperial expansion, informal or formel, Professor Wehler orgues, weak caused by a acciel system under pressure sarlving to retein its validity. Blsmarck's aim was social stability in a situation where unevent economic development, resulting from rapid industrinization, was causing social stress. His sociel policy was the internal aspect of e indicy was the internal aspect of stabilizing policy of which the external aspect wes imperialism. Imperialism was thus on integrating factor which found anglophobio entity of the control of the contro

## Women's place

The Feminist Movement in Germany 1894-1933 by Richard J. Evans Sage Publications, 17,40 and 13,50 ISBN D-8039-9951-8 and 9996-8

of the Third Reich as a continuous historical development in a missibilitation of the fundamental development in a missibilitation development in a precisional of the Third in a precisional development in a missional developm

The hasis of the book is n well researched chambological marrative of the development of feminism in Germany. It began in the 1860s as a relatively conservative movement which concentrated almost exclu-Intempolitik. Professor Monunsen himself contests the validity of the distributed on the validity of the distributed on the validity of the circuit and concern idece of writing is content to explain Hismarck's foreign policy. But otherwise the belief that foreign policy was determined by ecanomic, social and ideological causes colours the white book.

Karl Erich Born in the first chapter traws its bose line when he writes; "Germony changed between 1870 and 1918 from an ogration to

reference of the major feminist movement and serve the community in their own particular way.

It was in the 1890s and especially between 1894 and 1908 that a marked redicultation of the branal offects upon the structure of society of the disappearsnee of the new proletariat. Hans Rosenberg then deals with the downsids of the new proletariat. Hans Rosenberg then deals with the downsids of the new proletariat. Hans Rosenberg then deals with the downsids of the news of economic expansion which began to go upword in 1849 and turned downwards in 1873.

Furnished with this oconomic material the resder comas next to Jomes J. Sheehau's their the criterio of wealth, status and power hy each working so as to ploce different people in the top and mild-dling classes created those social disastisfactions which made it necessary to use foreign political purposes.

In the short composs of the next essay there is something of much more than particular eignificance. Due importance is normality siven.

organization in 1908; and that typerflow was indicative of the fact that there were already subquittive differences of opinion within the morettent.

liven at this time German feminists were a small looly. Fur-feminists were a small looly. Fur-thermore they seemed to be lacking in political realism in so the as-they expected that suffrage twould be granted to them without delay and failed to recognize the tumba-monaths. mentally authoritorian nature of Wilhelmine government, If the feminist movement in its

radical phase had limitations, he-tween 1908 and the ambrenk of war it moved markedly to the right; and ugain Erans chiots that this mirrored the general movement of German liberalism. Individualist ideas gare way to a völkisch collectivism which again emphasized waman's special role rather than her individual rights and he a furm of Sucial Durwinism which herame increasingly converned with rockel hygiene and Germany's declining high-rate. In the Weimar republic the feminist announced to present and the remaining the convenient of the feminist announced to present the feminist announced the feminist announced the present the feminist announced the feminist announced the feminist announced the feminist announced the feminism that the feminism movement concentrated its mtacks on the permissive sexual scene and hecame increasingly dominoted by economic interest groups whose pulitical ullegiance lay on the right.

In general this is a convincing occount of the feminist movement in Germany and Evans is quite right in arguing that its poculiarities were conditioned by the perticular nuture of Wilhelmine society, just as was social democracy. It is a greet pity, inwever, that the Social Democratic women's movement finds little discussion and that the fundamental haddles of the Contract formation. limidity of the German feminist is never really expluined. In this context one would like to see a fer more sustelled analysis of the sociol ment and more attention paid to the objective changes in the social situation of women in a rapidly expanding industriol economy. To the fait, however, Evans recognizes the fait, however, Evans recognizes these limits and cells for research in precisely these areas at the ond of his most informative book.

Richard Geary

#### Separate development

Disjoined Partners: Austria and Germony sloco 1915 by P. J. Kalzenstein University of Californie Press, £9.45 ISBN 0 520 02945 3

Two states, one nation": this is the formula currently used to oxpress the stoius quo in Europa with respect to Germony. When stolesmen and politiciens codey speak of an eventual solution to the problem of German requification, never is even the slightest mention made of Austris. However dresticelly, the Second World War has relegated the word Anschluss to the "scrapheop of history".

Dr Katzenatain takes us up to this policy. It is the essay by which the views of the school must be judged. Imperiol expansion, informol or formel, Professor Wehler orgues, wear caused by a aocial system under pressure striving to retein its valid. Ity. Bismarck's aim was social ity. Bismarck's aim was social stability in a situation where unservent economic development, resulting from rapid industrialization, was causing secial stress. His social policy was the internal aspect of estabilizing policy of which the turification and non-governmental clines. It is appears of the same totals of the leading Viennese doubles. He noted the presence of anstrian and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the presence of Austrian and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the presence of Austrian and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the presence of Austrian and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the presence of Austrian and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the totals of the leading Viennese dollies. He noted the purple of Austrian German and German symbols in oach appeach and editorial, and then correlated the fesuite statistically. The cesuit, we was a children to the statistical of the leading Viennese dollies. He noted the totals of the leading Viennese dollies.

ship " of Austria and Germany is used as a "caso study" to point the possible pattern of reletions between the Federal Republic of Germany and the German Democrotic Republic. Perhaps contrary to his lotentions, Dr Ketzenstein has shown us how unique the Austro-German case is. It is, therefore, doubtful whether any universally opplicable conclusions can be drown. Some questions must be reised

about his method as well. The euthor has attempted to trace the evaluation of Germany in Austria by analysing the Crown speechoa of the Emperor and the Inaugural speeches of his prime ministera as well as the New Year's Eva edi-torials of the leading Victurese dollies. He noted the presence or abserce of Austrian and Company

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#### Party times

The Grawth of Parliamentary Parties 1689-1742 by B. W. Hill Allen & Unwin, E7.95 ISBN 0 04 942149 2

i is often forgotten that Sir Lewis It is often forgotten that Sir Lewis Namier's aeminal study of eighteentheentury politics and natrouage was intended as a picture of political structure at the accession of Georga III. Dr Hill argues agalast the extension of Namier's portrail to the period before the death of Walpole. He shows that after 1689 regular parhagients and ufree press provided the conditions and sthuckers for the development of party. The Issues which brought about the Revolution and other issues which it aroused (issues concerning the church, the succession. cerning the church, the succession, floance and foreign affairs remained essentially matters which divided parties.

After 1689, the Whigs were in power and the Taries in opposition, and this necessitated some (often uncoasfortable) adjustments of principle. But the failure of William Ill and Sunderland to create an independent court porty is evidence in the attength of party feeling. Under Anne, the imminent succession question and the High Church challenge posed by Sachererell intensibled and clarified the still fundamental with the still fun fundamental rifts. Though both parties sought office, it was not office of any price. Harley failed in his attempt to overcome party

Tracing the story of parties to the death of Queen Anne, Hill provides the first full narrative which incorporates recent research which incorporates recent research into division lists and poll books. Together with his own exhaustive study of paniphlet literature and indicate correspondence, he has sketched for the first dime a complete, picture of the place of party in politics during both reigns. But Hill is most stimularing in arguing for the survival of party, and of the issues which fastered party, beyond the death of Queen Anna and through the years of Walpine's supromacy. After 1715 the Whigs were indeed divided among themselves by personnly quarrels and by different attitudes to the Church, the powere of the crown and the conduct of foreign affairs. The Tories, too, split from their Jacobite wing and some, in the face of a political wilderness, deserted to pursue office of Whigs, But for the most part, the Iwo parties auroled intact. The Tories in particular showed greet consistency in divisions from 1715 to 1754. showed greet consistency in divisions from 1715 to 1754. Though sions from 1715 to 1754. Industry they were in opposition, there was always the possibility that the Tories oright be approached to form an alternadve government. We should not be blinded by hindsight from seeing this possibility, especially when both Georges daugled it, as a threatening axe, before the Whigs.

Whigs.

Divisions between parties were still an important feature of Walpole's political world. His own long tonure of office owed much to the reluciance of most Torles and Whigs to join in opposidon to the ministry. Those like Bollishroke and Castares who tried to use parties for their dealgus, rather than follow any party programme, were the any party programme, were the failures of early eighteenth-century politics. Walpols was so aplendidly successful because he completed the

politics. Walpola was an aplendidly successful because he completed the transformation of the Whige luto a party of government.

Hill presents his argument with care, detail and scholarship. It is nona the less convincions because he is always ready to note the oxception at to make a qualification. His atylo is not easy to read and few concessions are made to the reader. Since the shifts and turns of diplomacy and conflict in Europe playad so much part in political alignments in England, e clearer picture of the European situation was needed as e back-cluth to the stage of detoestic politics. Hill's argument will not be fully appreciated by the student who has not already read much about the period. But if his is a book which makes demands, it is a study which roturns e high dividend. It cannot but be a permanent contribution to our understanding of the political world after 1689.

Kevin Sherpe

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The Inland Trude: Studies in Rag-lish Internal Trude in the Sixteenth petition from village shaps. and Seventeenth Centuries Manchester University Press, £5.95

ISBN 0 874718 538

Professor William's new bank is, as its sub-litle suggests, necessarily suntething of a miscellany. In many ways his studies of Elizabethan and Stuart retoiling form the most interesting part. Though a contemporary lawyer saw retailers as "not worthy the manne of merchannia, but af hucksters... who, cetaying small wares stera... who, retayling small wares are not able to bettor their own estate but with falschoole, lying and perjurye. The unther has not underestimeted their importance. He shows too that retailers and wholeselers in foet merged imperceptibly at the margins. ceptibly at the margins.

Although he deals with fairs oud markets, Professor Willau Is inter-eated in the smaller men. He finds pediers less important that have pedlers leas important than hove some previous writers and the provincial shopkeepers more significant. Biggar towns boasted a large number of shops—Nurwich had 150 grocers alone in 1569 (perhaps not all retailers)—hut who would have snapected that a Shrevsbury hank aeller possessed 2,500 volumes in 1589 or that a shapkeeper at diminative Kirkhy Laustule had a hewilderingly voried stack, ranging from French garters to catechisms? They were a husy breed. William Wray, mercer of Ripan apparently opened seven days a week and many provincial reteilers also supplied hiners and the professor William provides sed seventeanth century evidence suggests a growing number of hetter stocked shops, including af caurse trade in the Devil's weed, tolinecu. Well over 2,000 shapkeepers issued token colunge in 1649-72 and the

Buth the sections on those per truders and those on Elizabetha energing underline the inpression o society whose web of comme

Their patchy records raise non questions then can yet be answered. The Rochdale men made extension use of inland bills and could as occusion send clath overland to les don in only aeven to ten den (Transparr historians please note) But all these case studies tend n

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## Inside the Anglican mind

Church and Saciety in England 1770-1970: a Ristorical Study by It. W. Norman Clarendan Press: Oxford University Press, £15.00 ISBN 0-19-826435-6

Church and Suciety is Edward Norman's most important honk; it will make him few friends. It is substantial, Infuriating, often horribly funny and compulsively readable. It begins as a perceptive reappraisal of the Church of England's orient abnor society from the late eightneouth century onwards. It ends as a "Jennifer's Diary" of the Auglican intelligentsia from which na radical survives unscarred. Coleridge is shot slown as a serious ratical survives unscarred. Coleridge is shot illnum as a serious
social influence; so is Manulce.
William Temple is removed from
his pedrstal, and placed on a lesser
one. The episcopul hero is lieusley
llensan; the scalemic hero is
Canon Demant; the real hero is
the Anglican in the pew; and the
villains are liberal intellectuals.

Of course, Dr Norman is not ele-gant a scholar for such crudly. He belungs to the intellectual new right, which means that he writes well, with all that school's genius fut clurity and common sense. What emerges is the fullest survey of its subject, a brillant overview unbroken by such unaatisfactory dividing littles as world was or danger. ing lines as world wars, or danger-

Norman plays deftly with his themes. One theme is the ending of the interdependence between Church and State; and there is a particularly good chapter on Church-State relations between 1828 and 1846. Another theme is that the Church's leaders derive their social views from their peers among the intelligentsia and not from thealogy; hence their conflicting opinions and the fect that they

avoidance of party politics. To all Dissenters the Church was the

readily as radical obfuscation into blus. Thus, in the clerical shotton: that is Norman's twentleth century, the anity survivors are the Christian that is Norman's twentleth century, the anity survivors are the Christian trealists of the 1940s and 1950s; in never been the Tory Party at the control of the

invariably outpace the common assumptions of the day. This leads to a refreshing assessment of the Church's tax apposed to the Evaugelicals's role in the half century before 1830 and to an analysis of how influential Church-aien have consistently related sucial teaching and vital religion. There is nothing new about such concerns, although each generation has had to refliscorer the relationship for itself; Norman is realied to doubt the efficacy of the "Christian Sociologists" of the "Christian Sociologis

The unease which such ocademic sleight af hand provakas can be pru-jected heck into earlier sections af

Dissectors the Church was the Tory Parly at prayer (who cained that phrace?), even though most Liberal vuters, like most Liberal MPs, must demonstrably have been loyal Churchnen. As Norman expresses it, Church leaders were not political, they just belonged in the political classes, the never quite explains why clergymen appeared more class hound than mere politicians.

Yet the suspicion remains that this excellent book is only a tract; Indeed the nature of its argument is such their it cannot be under them they product of same intellectualism, apparent anti-intellectualism, apparent the product of same intellectual fad of its day—in this instance an apparent anti-intellectualism, appropriate for examining the Anglican mind, possible only for one with inside knowledge. A trahisan des clercs indeed.

For clear common seuse slides as readful as

**Epidemic** 

This study of the morbid pathology of British society in 1832 is a fascinating example of complexeocy underatined by terror. The ravages of the first cholera epidemic in England—here grophically described from medical and literary sources—threatened social stability and the equilibrium of classes although its demographic impact was smallar

equilibrium of classes although its demographic impact was smaller than that of corbier plagues. The impredictable course of the diseasa and its fearful symptoms strained relations between rich and poor, exposed the low standards of sanitation and public health and provoked considerable debato smong doctors and theologians.

The crisis created by the epidemic revealed certain weaknesses in convenience.

The crisis created by the epidemic revealed certain weaknesses in contemporary society. At one extrema it confirmed prophecies of the accord coming, at the other it caused worry about the burden on the rotes. Medical resources were shown to be inadequate and the doctors, obsessed with internal professional conflicts, failed to understand the disease. The branches of medicion which enjoyed greatest prestige were not those which could carry out the research needed to control cholers. The clorgy cusphasted the value of prayer, associated cholere with drink and advisad moral strength to overcome Ignor-

cholere with drink and advisad morel strength to overcome ignorance and losscurity.

Disputes between the inedical men and the administrators, local independence of central control, indecision and a general failure of authority made even the distribution of supplies and preventive measures ineffective. Both externel and internal quarantine arrangements falled and the disease apread from Sunderland because those in charge autrendered to pressure from vested interests. There was a reluctance in the coal business to stop trade, abstract by medical confusion.

fusion.

Although the social analysis is sometimes convoluted and repetitively oversisted, the general discust of the argument is forceful and convincing. This is a stimulating and successful attempt to examine the structure of a society under stress.

Richard Grassby

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## Fall of the Anglo-Irish

The Auglo-Irish Tradition by J. C. Beckett Faber & Fuber, £5.50 ISBN 0-571-10908-X

In a typicully modest preface, Protessor J. C. Beckett describes his
hook as "a work of reflection,
rather than of research"; but a
hool: by Ireland's most distinguished
historian, based upon o literina's
reading and thinking about his
country's past, is an event of major
scholarly importance. Beckett's
unique contribution to frish historical scholarship lies not unly in his
cool, balanced treatment of his subject, but also in his nbility tu cool, balanced treatment of his subject, but also in his ability to deduce from the evidence coherent noticens of development in Ireland's confused and troubled history.

It is just such a pattern that Seckett discerns in his study of the Anglo-Irish tradition. There might seem to be little comession between the modes.

seem to be little connexion between the motley handful of Anglo-Norman, Welsh and Flemish soldiers who landed at Beginbun Heed in 1169 at the invitation of the king of Leiester, and such great aspess at W. S. Yests, Henry Gretten, or Sir Edward Cerson: Bockett points out that they were the true fore runners of the Anglo-Irish in a political sense, in that they luid the foundations of English power in iroland. Leter generations of British sottiers inherited many of their idous and assumptions about British sottiers initerited many of their ideas and assumptions about fround and about their place in Irish political and social life. And although these later immigrants differed from the majority of the population in religion, although they were mombere of the estuditional they were mombere of the estudition of the majority of the population in religion, although they were mombere of the estudition. They built on oseendumy that flourished in the eighteenth contury, and was undermined, and finely extinguished, in the nineteenth and

The word "contribution" might seem to many an inappropriate one; an Irish nationalist might quiltile, perhaps asking whether one can talk about the "contribution" of the Huns to fifth-century Europe. Beckett argues convincingly, and with characteristic elegance, that there is no reason for the historian (as distinct from the pulltini propagandist) to regard the Auglo-Irish os anything less than Irish through and through Alrhough their concern for Ireland was, asternly enough, mixed with a healthy concern for their own interests, this did not prevent them from making a valuable and lasting contribution to their country. In politico, economics and the arts, their arrogonce and self-confidence, their sheer ability and confidence, their sheer ability and talent, enabled them to found Ireland's perhantenary tradition, to develop her economy, to grace her countryside with pleusing orchitecture, to enrich her literature, with fino poyels poeters and during

novels, poetry and drumo. And yet, despite their ochievement, the Anglo-Irish suffered from a dangerous flaw in their character; their ombivulence, their embiguity of outlook, arising from their need to be at once Irlon ond English. They could, for example, write about the Carrolic peasantry, as did Synge; but they could only du sa from the outside, since they could not share oxiside, since they child not share that pessandry's experience. For the Anglo-frish that multiguity became acute when in the late nunescendicentary they were confronted with a Calledle frish ussionalism which they could neither identify with, nor sneed with y resist.

A isw, like Thomas Davis, tried

twenticth centuries. It is the contribution made by the Aughstrish in the development of modern freland that Beckett describes and explains in his book.

The word "contribution" might seem to many an happropriate one; an Irish nationalism night quildide, perhaps asking whether one can talk about the "contribution" of the Cantacks Markievicza and Erking the Cantack of the contribution of the Cantacks Markievicza and Erking the Cantacks of the surface of the surface and the s With inclinded Constance Gore-Book (Countress Markievicz) and Rukhe Childers, as well as lesser koose figures like Robert Burton, one of the Sinn Fein signotories of the 1921 trenty. Why did they comed themselves to a Gaelle treland What attraction did it hold for them?

them?

It might seem, therefore the Beckett is after all the author of work of historical pathology, of course, all history is in a some puthology; but the Anglo-Irish man particularly dead duck. Becket will not offer that their tradition will not ollow that their tradition survives in the nurth-east part of Ireland, which he regards as see hodying o different, more self-regarding, Irish tradition; and had the south ond west of Ireland their numbers have dwindled rapidly since the Irish Irce Stato as created in 1922. Beckett argue that their fate is of concern to their country's future as well as its past. Their experience of nower and the loss of power; their resultant we don and breadth of nutlook; their frank recognition of the necessarity closo retailouship between Edital and treband; these are qualified that undern Iraland needs, and cannot find. Beckett does not imply that such a comprehensive legar is likely to be valued in the poleized Iruland of today. But it rates o brave historian to say that it o brave listorian ro say that it should. In this, as in all his work, beckett reveals his breadth of learning and also his sympathetic, yet stornly realistic, view of his fellow

D. G. Boyce

#### Primary sources on slavery

Slavery, Aboliting and Emancipa-tion: Black Slaves and the British Empire by Michael Craton, Junes Waivln and David Wright

Longman, £4.50 ISBN 0 582 48093 0

In recent years the ocone of slavery studies has been steadily enlarged, reflecting scholarly intendices obout neglect of the early phoses of slevery and the slave trade, about the habit of examining the experiences of different empires with these institutions in isolation and about relying on literary evidence and ignoring the position of free people of colour in slave societies. Interest in elovery has also grown among students, for it is a subject which lends itself weil to the feshioneble themoric, interdisciplinary and components a approaches to nary ond comporetive approaches to history. Moreover, while many students are motivated by simple indignation about capitailst expiditation and white recion, their attention is

kept by the complexity of stave systems, slave behaviour, African selves to offective illustration nititudes to the slave trade and opening in high most until trades.

The changes in plantation slave.

Glenn M. Linden

systems, sinve behaviour, African inititudes to the sinve trade and abultimalist activities.

The thoroughly up to due during mentary on sluvery lit the British Empiro by Crman, Walvin and Wright will meet the demand mannag contemporary history students, from school uge anwards, to use primary materials. There are socious containing manutated extrocts on the African trade, plantage the intellectual arigins of until sievery, on obolition, enumeipation ond opprenticeship. These are scholorship ond conclude with use ful suggestions for further reading, both of the documentary and necondary level.

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renge from S\$1,390 to 6\$4,750, approx., the initial amo

dspending on the candidate's qualifications and experience and the level of eppointment offered. The gross empluments comprise basic salary and live National

gross emojuments comprise basic salary and live National Wegas Council woge allowances. In addition, the University peys e 13th month ennuel allowance of one month's selary in Dacember of each year; end contributes to the staff membar's provident fund at 15 per cent of basic salery and allowances. Leave, medical, housing end other banefits are elso aveitable. Candidates should write to The Registrar, University of Singepora, Singapore 10, giving curriculum vitae (blo-dale), with full personal particulars end also the names, and addresses of three referees.

#### THE UNIVERSITY OF THE WEST INDIES

LECTURER/ASSISTAR

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LECTURER IN **EDUCATION** with special inference to Ifio innehling of Belanen.

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Sniary Scoles for 1878/77: Lec-turer 17517/739-527,711 p.d. Ashistant Lesierer Tr\$14,400-515,786 p.s. 161 ateriting equals 1734.051. F.S.S.U. Unfurnished occommodation if evaluate at 19 por, cant or furnished at 121 per sont or housing ellowance of 20 per cent of peestagable safery. Up to five full economy patencias on oppointment end on normal tarmination. Study and Travel Grant.

Selation application notaing three (3) refereos to Secretary V.W.L. St. Augustine, Trinded as noon as possible, Ostella oppal cont to all applicante.



ALCUIN COLLEGE

## College Bursar

Applications are invited from suitably qualified people for the post of Callege Sursar, vocant immediately. The period appointed will be responsible for the menagement of all non-academic aspects of the College Alouin College has accommedation for 300 students and staff, or it has actial facilities for non-resident members. Lociuse comes and leaching space for some academic departments is included. During vacations, the building is used extensively lur conferences.

Salary on the ocale £2,804 to \$5,527 per annum, the point of entry depending on qualifications and experi-

els copies of applications, noning lives relatess, should be sent by Friday, Fabricty 4, in the Registrar, University of York, Heolingies, York YOI SOD, from whom further delaits may be obtained. Planes quots refer-aces number \$/5022.

CAMBRIDGE THE UNIVERSITY UNIVERSITY ASSISTANT LECTURER IN TUBSIAN HISTORY

The Appointments Committee of the History Faculty intand to appoint from a Coloare and the Coloare of the Coloa

CAMBRIDGE

Cinaling dates 20 February

CARDIFF UNIVERSITY COLLEGE

Applications are inuited for post of LECTURES in the Rolary rongs E3,535 to £6,665 Nulles to commence int October, 1977.

#### University of Singapore FACULTY OF DENTISTRY

Applications are invited for teaching oppointments in the Dopertments of Operative Dentietry and Prosthetic Dentistry from cendidates who should possess relevent higher professional quefilications. Gross monthly emoluments in the range from S\$1,390 to S\$4,750, approx., the Initial concurt depending on the cendidate's qualifications and experience, and the level of appointment olfered. In eddition, the University pays a 13th month annual ellowance of one month's salety in December of each year, and contributes to the staff member's provident fund at 15 per cent of basic eajery end allowences. Leeve, medical, housing and other benefits are also available. Candidetee should write to: The Registrar. University of Singepore, Singepore 10, giving curriculum vitae (blo-dala), with full paraonel particulars and also the names and addresses of three referees.

#### THE UNIVERSITY OF MANCHESTER MANCHESTER BUSINESS SCHOOL APPOINTMENT OF DIRECTOR

The Council of the Manchesler Business School proposes to appoint a Director of the School on or after September 1st, 1977. The School has over 100 passignature and 200 pusi-experience audents a year, and more than 10 leaching and research staff.

The salary will be subject to negatiation.

Any persons interested are invited to address proposals, which will be treated with the strictess contidence, not later than March 14th, 1977, to the Vice-Chancetfoe, The University, Menchester Mis 9PL, from whom further particulars of the appointment may also be obtained.

HONG KONG

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UNIVERSITY COLLEGE DUBLIN

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> HONG KONG THE UNIVERSITY

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HONG KONG CHAIR OF MATREMATICS
Applications are invited for
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and of Profesor Y. C. Wong

HIELAND PARTESTY CHELLICE DEPARTMENT OF LUMBARY AND INCOMMETON STRUCTS

Applications are invited for 50 majetude appointments of inclosed of ellipor Assistant sectors or College Lectures INFORMATION RE (IT INFORMATION RE-TIOLYAL (II) HIM POGNAPHICAL HIS-SOURCES Conditates should have an appropriate academic and pro-lossional background with tea-ching payerience. The current salary scales Assistant Lecturer: 93,231-25,450, College Lecturers: 95,20d-17,167. 17,107.

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A nun-contributory technion scheme and fundly allowances are additional to salary. An alternative contributory tenatura scheme sinilar to the FSSU scheme is filso available.

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The Facility of Engineering and Technology University of Jordan is interested in the recruitment of laculty manufaction the OPIAHITMENT of ARCHITTECTURAL and CHEMICAL ENGINEERING. Applicants for the Architec-lural Engineering Department should have a higher dayree in Architecture will a nithouting toaching experience of live aara. Appliconis for lie Chonical Rolnoring Osparimeni should a Illienical Englicoca wilh a ii O. In Cheulcal Englicocing. acchino experience of an errodiod insiliulo is protor-ole. scendilod insiliule is protoroble,
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I A POR SOUTH THE MENT OF THE WEST Fellowships and Studentships

University College

Oxford Fellowship in Modern History

The College proposes to cheef, with effert from 1 Ditaker, 1977, a Fellow & Franketter in Modern like force without his largest as post-1700. A partime University Lecturesity is associated with the Fellowship and the sucressful conditate with be eligible for appointment to this post by the liberty. Applications of the property of Modern History.

Applications, giving pro-ficulars of qualifications and experience, and the names of three referees, should be sent to the Senior Tutor, from whom further particu-lars may be obtained, by 12 February.

#### **Polytechnics**

ULSTER COLLEGE THE NORTHERN IRELAND POLYTECHNIC Faculty of Science

#### **HEAD OF SCHOOL OF ENVIRONMENTAL SCIENCES** HEAD OF SCHOOL OF LIFE SCIENCES

Salary Scala, £7,707 to £8,913 Two new Schools are being created by dividing the work of a single School in the Faculty at Science. A Director of Statios and Hand at School is required for each new School. He or she will be requested to give ocadonilo loadorship in luaching and miseach to a well-qualified group of staff who heach on a rusge

of degree and diploma control. The School of Environmental Scancers includes the elleciplinus of Grangraphy, with the drynlaman of a now option in Human Grography, Guidegy and

Ecology.

The School of Life Scharces nature, the disciplines of Biology, Biochemistry, Made at traditional sciences. Anatomy and Physiology.

Condidates for nation post should have a great language. degree and a resourch incord in one of more of the

disciplinus of the School. The Polyloelinic is a throck grant institution with an Independent Bourt of Gavernatis. It opposes in 1971 and new line a student population of snure 6,100. It has extensive new purpose built incommedation.

finduding 750 realdontial places on a 114 acre campus eventocking the eas of Jordanstown, a decarant and quiet residential oren. There is a scheme of neeslance with removel. The Polytechnic is croofing a limited number of Professorships in which academic leadership—including leaching, course development and research—will be emphasized. The successful applicant let the act with the course of the successful applicant let

this post will be eligible to epply. Further perliculars and application forms which must be returned by February 8, may be obtained by left-phoning Whiteabbey (0231) 65131, 0x1. 2243, or by writing to:
The Esteblishment Officer, Uisler College, The North-

ern Ireland Polytachnic, Jordanstown, NEWTOWN-ABBEY, Co Antrim BT37 00B.

#### RE-ADVERTISEMENT

#### Dean of Faculty of Art and Design

Sunderland Polytechnic

The Feculty cutranily has two Departments, Fine Art and Applied Studies in Art and Design. Cendideles are sought whose soedemic qualifications and pest experience will enable tham to give significant leadership in course developments. ficent leadership in course developments, research in its broadest sanse and the edministration and development of the

edministration and development of the Faculty.

Experience in some area of Applied Studies in Art and Deelgn will be a not overriding adventage, as will be the ability or potential to make a contribution outside the Faculty, both to the Polyschnic and the community at large. The salery is £9.963 Burnham acale. At application form and further paticulars may be obtained from the Personnat Officer, Sunderland Polylechnic, Chesist Road, Sunderland SR1 350, and should be returned as soon as possible.

be returned es soon es possible.



Polytechnics continued

THE STREET PROPERTY OF THE PROPERTY OF THE PARTY OF THE P

DUNDEE COLLEGE OF TECHNOLOGY

Resulting from the reheat of the present incumbent applications are invited for the post of

#### HEAD OF DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

The college is a Scotlish central institution with a subsigntial and growing range of degree and diploma courses.

The department of electrical and electronic engineering provides courses leading to honours and unclustrated organical and to the higher helional certificals, together with various epocialist short courses. The person appointed may be aligible for a prolessorship and applieants should have appropriate seedamic qualifications, experience of teaching at degree level and relevant indus expensions of teaching at degree leval and relevant indus-friel nnd/or research experience, together with a proven record of administrative ability. The salary (at present under review in the light of the Report of the Houghton Committee) is £6,325.

Further particulars and application form obtainable from the Principal, Dundae College of Tachnology, Boll Strael, Dundae DO1 1HG, to whom completed application forms should be returned by 4 February 1977.

#### DUNDEE COLLEGE OF TECHNOLOGY LECTURESHIP in ACCOUNTANCY

Applicants should be honours greduetes or hold eppropri ale equivalent professionel quelifications; they should have substantial precilical or research experience and/or have substantial experience of tasching at undergreducte or poalgraduate tevel. The person eppointed will be required to contribute to the general leeching of Accounting and to a specialist field, praferably in linancial or

#### LECTURESHIP in CIVIL ENGINEERING

The person appointed must be able to leach up to honours degree leval and applicants should be civil engineering graduates with appropriate teaching and research/precical expariance. They should have a specialist interesi in Hydraulics, Hydrology, Public Hoelth or Soil Mach anics: The ability to leech Surveying would be an added

Sstary Scale, £3,528 to £6,324 (bar) to £6,807, with initial placing dependent upon approved prior experience Financial against towards the cost of removal expenses

Further particulers and application form obtainable from the Principal, Dundes Collage of Tachnology, Bell Street, Dundes 001 1HG, to whom completed forms should be returned not later than February 11, 1977.

#### Leeds Polytechnic School of Health and Applied Sciences

#### LECTURER II IN NURSING

to teach on the BSc (Nursing) Course and other nursing courses being developed in the School. Applications are welcomed from well quelified nurses with up-to-date knowledge of clinical nursing. ilmants to be taken up as agon as possible. Salery Scale:

Lacturer II: £3,591-£5,805 with a possible extension to the Senior Lecturer Scale £5,343-£8,267 (bat)-£8,729. Includes the £312 per ennum supplement. Details from:

The Administrative Services Officer (N.13) Leade Polylechnic, Calvarley Street Leade LS1 3HE 0592 41101 Closing date: 4 February, 1977.

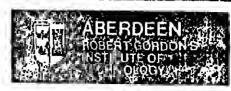
#### Administrative Assistant to the Director

An Administrative Assistant is required for the Director of the North East London Polytechnic at the Wost Ham Procinct. Romford Road, London E15 4LZ. The post has aftern as a sessit of the promotion of the previous posthoider, Aplitudes sequired for the postition are a reasonable knowledge of the H.E. System of the U.K., demonstrable shiftly to work independently, shiftly to take notes [not necessarily shorthand) and the shiftly to type.

The position may be of interest to a graduate secretary, not less than 28 years of egs, who wishes to move to a position of more responsibility. more responsibility. to post is graded AP4/5 (25,923 to 24,482) including London Allowance.

Puritier details and explication form can be obtained from the Puritier details and explication form can be obtained from the Proceeding Officer. North East London Polytechnic, 108 The Olosing date: 4th Fabruary, 1977.

North East London Polytechnic



SCHOOL OF SOCIAL STUDIES

#### SENIOR LECTURER IN **PUBLIC ADMINISTRATION**

To contribute to established courses and act as Course Leader for Social and Public Administration option of proposed degree in Social Studies.

Applicents should have Henours of Higher Pegree III Public Administration, or related disciplines, and relevant experience.

Salery in renge £6,312-£8,028 per ennum. Assistence with removal expenses.

Deteils from Chief Administrative Officer, Robert Gordon'e institute of Tochnology, Schoolhill, Abardeen AB9 1FA.

ULSTER COLLEGE THE NORTHERN IRELAND POLYTECHNIC faculty of Education

#### **LECTURER I/LECTURER 11/** SENIOR LECTURER (2 posts)

Senior Lecturer: £5,031-£5,955/£6,417 plus £312 supplement Lecturer I: £3,279-£5,493 plus £312 supplement Lecturer I: £2,469-£4,377 plus £312 supplement

Lecturer I: £2,469-£4,377 plus £312 supplement Applications are invited from cuididates with oppropriate graduate or postgraduate qualifications to contribute to the development of courses in sports studies, leisure studies and dance and drama. Grading of the appointments will depend upon qualifications and experience.

The Polytechnic is a direct gront institution with an independent Goard of Governors. It opened in 1971 and now has a student population of some 5,100. It has extensive new, purpose-built accommodation, including 750 residential places on the 114 acre compus overlooking the sea at Jordanstown, a pleasant and quite residential area. There is a scheme of sysistence with removal.

Further particulars and application forms which must be returned by February 7th, may be obtained by tetephoning Whiteabbey 10331 65131, evi. 2243, or the virtual in: The Establishment Officer, Ulster Cullege, The Northern Iroland Palyteconic, Jordanslowo, Newtonoosboey, ee. Autoin 1875 00B.

#### LDNDON

POLYTECHING OF THE FACULTY OF ADMINISTRATIVE OLVISION OF LAW

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NORTH STAFFORDSHIRE LECTUREN IN BOCIOLOGY

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WOLVERHAMPTON THE POLYTECHNIC OFFARTMENT OF FUILDING LECTURER Grade IL/SENION TROUNDLOGY AND SERVICE Solard John Manager (Jando II. 63,693, to \$6,800 i Revine et 62,545). I Senior Lecturer, 25,445, to \$6,467 in John Manager (Jando II. 65,467, to 10,646, t

NORTH STAFFORDSHIRE THE PULYTECHNIC CACULTY OF APPLIED LECTURER DISENSON

Balary scale: Lecturer 1: 23.379 to £5.493. Sonlor Lecturer £7.031 to £5.055 (Ber) £6.417 and supplement of £312. of £314.
Application forms and further perticulars may be obtained from the Doubly Oracler (Smiling), North Staffordshire Volylochuc, Collegion (Smiling), 124 205 Telephon UFEL #8551).

> PRESTON THO POLYTECTINIC ACAGENIO REGISTRAR

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Announcement

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Announce inents

COMPUTER MUSIC Prolessor Ourry Versoe, Director of Computer Music Facilities at Massachusetts insittule et Tectinology and author of 'Music 360', the lore nost language lor compuler music syn-The City University, Lon-Compute music synthesis: man-machine intersction in macrine interaction to creelive epplications, will be given et 6.00 p.m. in Lecture Room U214 el The City University, et. John Street, EC1V 4PB. Adultion hee.

#### Awards

DISTORICAL RESEARCH GRANTS

Applications are invited from L'ulted Kingdom graduales for grants in aid of publication or consistent et advanced work in bistory history
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#### A CONTRACTOR OF THE PARTY OF TH Holidays and Accommodation

#### Institute of Higher Education

ROEHAMPTON INSTITUTE OF HIGHER EDUCATION Applications are invited for the following post at SOUTHLANDS COLLEGE.

#### PRINCIPAL LECTURER or SENIOR LECTURER in MULTICULTURAL STUDIES

The person eppointed will be responsible for leading the team teaching a Olptoma Course in Education for a Multicultural Society and for coordinating contributions from this area of study to PGCE, BEd, BA, BH and other courses. Applicants should have strong academic quali-floations and wide experience in teaching and multi-culturel work, and be capable of developing in service courses and courses leading to higher degrees in Multi-

cultural Studies.
Further particulars and application forms are avoilable from the Principal, Southlands College, Wimbfedon Perkaide, London SW19 5NN (Tel.: 01-946 2234). Closing date for receipt of applications: 5 February 1977.

#### Administration

Newcastle upon Tyne Polytechnic Chief Administrative Officer's Department

#### SENIOR ADMINISTRATIVE OFFICER (£6,708-£7,386)

To be responsible to the Chief Administrative Officer for the central general administrative and operational services of the Polytechnic and to assist bins with specific aspects of the orannenance and development of the services provided by the Department.

NJC Salury and Conditions (PO2 pis. 4-8). For jurther particulars and application forms, returnable by Wednesday, 2nd February, 1977, pleaso sond stamped addressed foolscap envelope to Staffing Officer, Newcastle upon Tyna Polytechnic, Ellison Building, Ellison Place, Newcastle upon Tyna NB1 88T.

#### BRITISH RED CROSS SOCIETY



REMINDER

Copy for Classified
Advertisements in the
THES should arrive
not later than 10.80 am
Mondey preceding the
date of publication



40.53

#### Bulmershe College of **Higher Education**

#### 1. Head of Learning Resources

A new senior post has been created with responsibility for e major library and for managing Collage laerning resources. The College le looking for a graduate Librarian with e eirong interest in organising multi-media learning provision in the higher education exclor. This post is baing re-advertised as it has now been regreded to Head ol Depertment Scale IV. Pravious applicants nead not

Balery scale: £6,756-£7,832 ( + £312 supplement)

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Further particulors and application forms, returnable by 4th February 1577, ern sysilicijo irom Principal's Sacralory, Sulmarshe Colings of Higher Education, Enrisy, Reeding BOS 1HY, [Tsinphone: Reeding

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Further particulars and application forms from the Education Officer (EO/Estab 2A/1), Addington Street Anners, its County Hall, London SEI 7PB Forms to be refurned by 4 February 1977.

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Overseas

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